THE

LARYNGOSCOPE.

VOL. XX. ST. LOUIS, JUNE, 1910. No. 6.

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

SYMPOSIUM—THE DEAF CHILD.

1. **The Deaf Child from the View-Point of the Physician and Teacher.** By JAMES KERR LOVE, M. D., Glasgow, Scotland.
2. **The Physiology and Psychology of Hearing with Special Reference to the Development of Speech.** By G. HUDSON-MAKUEN, M. D., Philadelphia.
3. **Clinical Aspects of Deaf-Mutism.** By F. R. PACKARD, M. D., Philadelphia.
4. **What the Physician May Do for the Deaf Child.** By M. A. GOLDSTEIN, M. D., St. Louis.
5. **Development of the Hearing.** By MRS. J. SCOTT ANDERSON, Swarthmore, Pa.
6. **The Mental Development of the Deaf Child.** By E. M. GALLAUDET, Ph. D., LL. D., Washington.
7. **The Development of Speech in the Deaf Child.** By A. L. E. CROUTER, LL.D., Mt. Airy, Pa.
8. **Development of Language in the Deaf Child.** By J. W. JONES, Columbus, Ohio.
9. **The Development of Speech-Reading in the Deaf Child.** By MISS MARY MCCOWEN.

THE DEAF CHILD FROM THE VIEW-POINT OF THE PHYSICIAN AND OF THE TEACHER.*

BY J. KERR LOVE, M. D., GLASGOW, SCOTLAND.

Speaking as I do in the city of the younger Gallaudet, the greatly respected Principal of the College for the Deaf, I am reminded that nearly 100 years ago his father came to Scotland for information about the education of the deaf, and that we metaphorically shut the door on him. Gallaudet met with the same treatment in England, and must have met with it in any country where speech was taught to the deaf, for at that time the art was a proprietary one. Gallaudet turned, therefore, to France, where the Abbé de l'Epée's sign-system could be openly examined.

I am here, therefore, if you will let me say so, to repay a little bit of national debt, and I take this opportunity of thanking this American Society for giving me the chance of doing so, and also for the great honor they have conferred on me by inviting me to come here.

To understand just what speech means to man we may reflect on the cases of those children, few in number, who have grown up outside of human society with only the lower animals for companions, and, using this as a link, we may travel back in imagination to that period in human history when speech was not.

Leaving this stage, with its sign-language, its inarticulate vocal calls, its poorly developed thought, and, returning to our own time, we find primitive speech such as may still be found amongst barbarous tribes. Writing of some kind must have been the next great advance in civilization and, although we do not know the names of the inventors and are hardly sure of their nationality, two inventions followed beside which our railways and telegraphs are relatively unimportant. I refer to the invention of the written alphabet and of the system of numerals. With speech, a written alphabet, and a system of numerals, the progress of man was assured—the printing press and the electric telegraph valuable but relatively unimportant later details. Speech is the silver bridge over which the thought of man has come to travel. When an adult becomes deaf, this bridge is broken at its further end, and is best repaired by using the eye for the lost ear. In congenital deafness the whole bridge has to be laboriously built without the aid of the architect—the sense of hearing. If less worthy material than

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

speech be put into the structure, the pasage of thought is impeded. The deaf man feels lonely and the deaf child, who would reach out to all knowledge and truth, is disappointed because he is misunderstood and his questioning glance is not answered. That signs are *the* natural language of the deaf is a statement constantly reiterated in books and on platforms. This is a dangerous half-truth. Signs are really *a* natural language, both of the deaf and of the hearing. Speech has become *the* natural language of man, and a far more important one than signs.

THE ATAVISM OF SIGNS: In the absence of hearing, which so greatly facilitates the acquisition of speech, deaf children take to signs naturally by reverting to the habits of a more primitive type —by atavism, in fact. Similar reversion are the ability to move the ear by means of the extrinsic aural muscles, and the tendency to scratch by a scolding woman who finds her speech insufficient to express her anger.

Now, I do not say that the ability to scratch and to make signs is of no value. Under certain circumstances I am prepared to justify both. But to describe either as natural, except in the sense that they are "reversions," is incorrect. In education we must bring the deaf into the company of the hearing, for we will never get the hearing back to the pre-speech stage of language—the stage of natural signs.

In looking over the work done for the deaf during the past 300 years, one is struck by the scarcity of medical names on the list of workers. These years may conveniently be divided into almost equal periods of 150 years, the first or sporadic period beginning with Bonet, towards the end of the sixteenth century; the second or systematic period beginning with de l'Epée, about the year 1760 and extending to our own time.

THE CLINICAL PERIOD: I think that we are at the beginning of a third period, which I may call the clinical period, during which medical men and teachers will co-operate with results beneficial to the deaf child in a degree hitherto undreamt of. Hence the importance of this meeting.

The cause of the neglect of the deaf child by the medical man is that the former has never been regarded by the doctor as a patient. A patient is a diseased person who is being studied and treated by a doctor. Now our chief business is to get the deaf child raised to the rank of a patient.

During these 300 years several medical names appear. In the sporadic period Dr. John Bulwer published, between 1644 and

1648, several works on the education of the deaf. There is nothing clinical in Bulwer's treatment of the subject of deaf-mutism, and his writings might be the product of one of the philosophical divines, like Holder or Wallis, who wrote during the same period. The work of the sporadic period was chiefly oral. The preference for the oral element was based on what we may now regard as a fortunate fallacy—that without speech there could be no thought. But for this fallacy one can hardly see how any of the deaf would have been taught at all. As it was, the sporadic period was that of the education of the deaf-rich.

Another medical writer of the sporadic period was Dr. Amman, born at Schaffhausen, Switzerland, in 1669, and in after-life a practitioner at Haarlem, Holland. Amman was an oralist; even the titles of his books proclaim him so. "Surdus Loquens" and the "Dissertatio Loquelae" are eloquent of their purpose. But with Amman there is no traceable physiological basis for oralism. Speech and language are represented as gifts bestowed on man at his creation, all but lost at his fall, and now existing, even in the hearing, as a conventional artifice without which we should be mute. Amman's oralism was based on his views on the divine origin of speech and on his mistaken idea that only speech could be regarded as language.

Coming now to the second or systematic period, which began with the Abbe de l'Epée and Heinicke, we find in the educational record hardly any medical names at all. With the single exception of Dr. Graser, of Bavaria, who introduced the practice of making the education of the deaf a part of the public school system, no medical man until recent years seems to have taken any interest in the education of the deaf. Deaf scholars on Graser's plan spent one and a half or two years under special training before entering the ordinary schools for the hearing. This plan failed, as even with our better organized school system it would, I think, still fail. In 1880, Hartmann, of Berlin, wrote his book on deaf-mutism, by far the ablest medical work on the subject which has ever appeared. Hartmann's book is full of insight, not only regarding the morbid anatomy of deaf-mutism, but regarding the living deaf-mute child and his educational problems, and has not received the attention it deserves, either from medical men or from teachers of the deaf.

What, then, was the attitude of the medical profession during this second or systematic period, at the close of which I am speaking? Generally the doctors refused to regard the deaf-mute child

as a patient, but thought he would make an interesting pathological specimen. "He is deaf and dumb and I cannot do anything for him, but send me his temporal bone after he is dead and I will examine it; the result will be very interesting." Thus spoke the doctor.

From the end of the eighteenth century until now we have about 200 examinations of the temporal bones of deaf-mute children. Now, if this attitude of my profession were merely a historical one, I should not discuss it, but, inasmuch as it is still quite a common one, it merits examination.

That interest in a deaf child is chiefly a post-mortem one amongst present-day doctors is easy to prove. Three or four years ago I visited Mygind, of Copenhagen, whose work on deaf-mutism from the side of morbid anatomy is of great value, but who has no connection with any institution for the education of the deaf, and, if you will refer to Mygind's book, you will find that he treats the subject of education of the deaf in a single page, and, whilst indicating a preference for the oral method, he dismisses the question of whether all should be taught orally or some manually by saying that "the solution of this problem must be left to pedagogues."

Further evidence of this kind of preference for the deaf child is that in the otological journals nearly all the references are to the post-mortem findings, seldom to the clinical features of the deaf child. As a subject of scientific research the examination of the temporal bone of deaf children is interesting and valuable, but it is of little educational value. There are two reasons for this. The diseased process is a finished one, and even a complete knowledge of the pathology of deaf-mutism would not enable us to do anything to cure the deafness which causes the mutism. The disease has long ago destroyed the elements of the cochlea and we will never be able to replace them. The reason is that, although the deafness is due to changes in the internal ear, these are merely an outwork or by-product of a more general disease, and it is the prevention of this latter and not the study of the by-product which will help the children of the future. This is true of measles, scarlet fever and meningitis (by far the commonest causes of acquired deafness), and it is true of syphilis, perhaps the commonest cause of congenital deafness.

Even as a department of scientific investigation this study of the temporal bone is robbed of much of its value by the fact that it is very difficult to place alongside the pathological findings the clin-

ical history of the illness causing the deafness, or even to state whether the deafness is congenital or acquired.

Recently Bezold, of Munich, has added an interesting section to the study of the deaf-mute child. He has mapped out the islands of remaining hearing, as I have done in the chart I show you here. Bezold was the most careful clinical investigator of the deaf child whom I have ever seen at work, and, if I could get the temporal bones of these thirty deaf children and examine them and then place the pathological findings alongside the clinical chart, I might be able to throw some light on the physiology of hearing and the pathology of deafness, though I could hardly help the deaf child. But, as these deaf-mutes are all young, healthy children and likely to outlive me, what chance have I of completing my picture?

While this kind of research certainly should go on, I appeal to the practical men in both professions to look at the living deaf child, to see what is left of his hearing and speech, to see that the most is made of his eye-sight, and, whilst aiming at acquisition of speech in as many cases as possible, to cease teaching defective deaf children by a method which is unsuitable.

If during the systematic period the doctors have done so little, what have the teachers done? Briefly stated, they have elaborated two opposing methods and made them about as perfect as human effort is likely to make them. I refer to the manual-alphabet method and to the oral method.

De l'Epée and his successor, Sicard, did all that enthusiasm and genius could do to perfect a system of signs, and they failed. They based their system on the fallacy that signs are *the* natural language of the deaf. De l'Epée assumed that the natural or mimic language of signs was the only one in which the deaf could think or reason. Now signs are no more the natural language of the deaf than of the hearing, but, in the absence of speech, they are the best the untaught deaf can do in the way of finding a substitute for speech. Speech is natural to both hearing and deaf children, but the conventional forms in which it exists are not natural to either. Both have to learn these forms, and in the absence of hearing this task is very difficult; hence deaf children fall back on the easier and more primitive language of signs.

If what I am stating about the natural languages of the deaf seems to belong to academic discussion and not to practical education, I have to remind you that fallacies on this point have given definite and opposing directions to the efforts of educators for 300

years, and have produced a war of methods existing over 150 years —a war which is not yet over. Here I wish to state that speech is *a* natural language of deaf children, and that our business is, wherever possible, to assist in its development.

To talk of signs as the natural language or the mother-tongue of the deaf is physiologically incorrect. If you hearing people enter a foreign country, the language of which you do not know, you will have to sign. You will take to it as naturally as the deaf and dumb, and, if you are looking for a lost traveling-case, you will spend an hour in trying to make yourself understood and may fail in the end, although the case be lying in the back-room of the agency all the time.

Ladies and gentlemen, you may have as much language as you choose, you may have as many languages as you choose, but unless you have that language which is known to the group of people around you and unless you can express that language in speech, you do not belong to their world. Signs are not *the* language of nature; they are *a* language of necessity forced on impaired or uneducated human nature. If a child have neither sight nor hearing, he uses a more primitive language still, the language of the sense of touch—the language of a sense which existed before either eyes or ears had appeared amongst living creatures.

In talking of natural languages and mother-tongues, let us be quite clear *that speech is the natural language of man*. During the latter half of the eighteenth century, when de l'Epée in France and Heinicke in Germany turned their attention to the public education of the deaf or to the education of the deaf poor, no educational arrangements existed, even for the hearing, which were at all comparable with those of our own day.

Neither de l'Epée nor Heinicke started life as teachers of the deaf. De l'Epée was first a clergyman, then a lawyer, then again a clergyman. He was nearly 50 years old when he accidentally met the two deaf children who gave him the chance of doing the great work of his life. Heinicke was first a farmer, then a soldier, then a tutor and secretary, and, lastly, a precentor at Eppendorf, where he stayed till 1778. He, too, like de l'Epée, was by this time nearly 50 years of age. There was still no public school for the deaf. Heinicke educated one deaf boy with some success at Dresden during his soldiering period, and a few more at Eppendorf during his precentorship, and, because of his success with these, he was asked by the Elector of Hanover to come to Leipsic

and found the first school for the deaf in Germany. This was in 1778.

Such were the first public school teachers of the deaf. They had no training as such, and any help they could get was from the books written during the sporadic period by the men who had taught single, or, at most, two or three children of wealthy parentage. Neither these teachers nor their successors had any idea of the capacity of deaf children. They discovered that the average deaf child could be taught, but they had no idea of his ever taking his place in the hearing world.

Deaf children had to gather round these pioneer teachers, and, as the children were poor and the work had to be done by charity, *the institution was inevitable*. Even if the education of hearing children had been general then as it is now, even if it had been compulsory and free, as it now is in many countries, the institution for the deaf would have still been inevitable, for the deaf child himself was not understood, and when the first institutions in England and America were established they called themselves asylums.

Now in describing the institutions as inevitable and recalling their original titles as asylums, I am not condemning them. They were just what they called themselves—homes where the deaf children of the poor were clothed and educated. These asylums or institutions have done a magnificent work. Without them the deaf children of the poor could not have been educated. For 100 years they did for deaf children what must otherwise have gone undone. But they have done more. Gradually within their walls the capacity of the deaf child has come to be recognized, until now his teacher is not afraid to state that, unless the deaf child be also mentally defective, he will with time and patience make him a capable and reliable citizen—a help and not a burden to the state. *This is the great work of the institutions.* What would the deaf child of to-day do without the experience which the teaching of his predecessors in institutions has accumulated?

A glance at the arrangements for the education of the hearing children of the latter half of the eighteenth century may now be taken. In France, where the first public school for the deaf was started in 1760, education was in the hands of the Jesuits. When the children of 1760 had grown to be adults—say in 1790—53 per cent of the men and 73 per cent of the women could not sign their names to their marriage contracts. The teaching of hearing children was entirely in the hands of the church, and the church taught

them nothing that had for its object the making of useful citizens. Protest was constantly made that even the French language was not taught, that history and geography were not taught, even to advanced scholars, and that education was nothing more than the study of books filled with "vain distinctions and frivolous questions." La Challoais and Rolland, the great pre-revolutionists, had not begun to write. The essay of the former did not appear until 1763, and Rolland's report was not made until 1768.

Even at the revolution, when Mirabeau and Talleyrand laid down the principles on which the education of the child must proceed in the interests both of the individual and of the nation, practically no work had been done for the hearing children of the poor. An interesting exception to this statement may be made in the case of the schools founded by La Salle, because these were residential schools for hearing children, in which speech was repressed as much as possible and much of the teaching done by a system of signs.

In the German countries the education of hearing children was hardly better than in France. True, public instruction was considered to be an affair of the State, and education was less under the control of the church than in France, but the results were very poor, and most of the children of these countries got no instruction at all.

When Pestalozzi, the de l'Epée of hearing children, took to teaching fifteen years after the French Abbé, it was to found an asylum for poor children at Neuhof.

In England, where the first public school for deaf children was started in 1792, the institution for the deaf must have come, even if it had existed in no other country. The grammar school had existed for the children of gentlemen for 200 years, but it was only during the eighteenth century that the charity schools began to spring up.

"These latter were founded on a conception of education partly religious and partly feudal, but almost wholly ignoble and humiliating. The children were to be taught the church catechism, reading and writing, and in a few cases arithmetic, but were to be sedulously discouraged from attempting more. They were to be clothed in a distinctive dress so as to show that they were objects of public benevolence and to remind them of their rank. There was no provision for girls in the grammar schools, but as a girl might, if poor, be needed to contribute to the comfort of her betters as an apprentice or a servant, the charity schools were open to her."

Surely in England more than in any other country the institution for the deaf was inevitable.

Now I am not going at this stage to refer to the advantages or the faults of the institution system, but I wish to point out here two of its results. The deaf child had to leave his home and he had to associate outside the class-room with other deaf-mute children.

The definition of the deaf-mute child was and is, not what he could do, but what he could not do. He could not be educated along with the hearing children of ordinary schools. He might be wholly or partially deaf; he might be wholly or partially mute; he might be only very hard of hearing and have perfect speech. He might be aphasic with perfect hearing—dumb but not deaf. He might be mentally defective to the verge of idiocy or he might be bright and intelligent. It did not and does not matter. Out of the home and into the institution he must go. There was nowhere else for him and there is, generally speaking, nowhere else now. So that the institution for the deaf became a kind of dumping ground for what the ordinary schools could not deal with; and in most countries it is so still. Now such a statement needs proof; for if it is true, the condition which it describes should be altered.

If you scan the membership of a deaf-mute class in the ordinary institution or in the ordinary day-school for the deaf you will find it composed as follows: There are ten or twelve children. One or two are semi-deaf or very hard of hearing—that is, they speak because of the remaining hearing they have; one or two are semi-mute children who speak because of the speech they have not forgotten and which they acquired during the early hearing years of their lives; one or two are mentally defective deaf children; and there are half a dozen ordinary deaf-mute children.

Now you *may* have two methods carried on in the same institution, *but you cannot have two methods carried on in the same class,* and unless it can be shown that there is one method which suits children so unlike in educational needs, a minority must suffer, and this minority is often a large one. The truth is that the semi-deaf and semi-mute should not associate with the deaf-mutes at all even in the class-room. Their habits of thought are those of the hearing child. On the other hand, the mentally defective deaf child cannot be profitably taught orally, and in any case he wastes the time of the ordinary deaf-mute child and he will never use his speech. So some kind of classification is necessary; and in very large institutions some kind of classification is possible and occa-

sionally is attempted. In the New York institution, for instance, I saw a class of semi-mute children, all the product of cerebro-spinal fever. At Dresden I found the children in the institution classified into A, B and C classes. A having most of the semi-deaf and semi-mute; B, the ordinary deaf-mute children, and C, all the weak-minded children. In London all the mentally defective children are in a separate institution. In Denmark the semi-deaf and semi-mute are in one institution, whilst the mentally defective are in another. But such arrangements are quite exceptional. The general practice is to have all kinds of deaf children in one institution or school and to have them distributed throughout all the classes. And this state of matters is getting worse. Compulsory education is sending many hitherto neglected children and medical inspection many hitherto misplaced children into the institution for the deaf, and as many of the former are physically and mentally poor and many of the latter speak and are only very hard of hearing, the need for classification and separation is growing.

What would you think of the physician who treated all feverish complaints with an antipyretic and made no difference in his treatment? If influenza, smallpox, enteric fever, and diphtheria were all treated by phenacetin or antipyrin merely because the temperature is high in each, and if no directions were given about diet, or no antitoxin used, what would become of our patients? Or if all abdominal pains were treated by purgatives without differentiation of causes, what would the death rate become? So, if all children are to receive the same educational treatment, because they are more or less deaf and therefore cannot benefit from the classes in an elementary school, how can the best be done for them?

As an example of how clinical examination makes for correct classification and for more efficient education, I might instance the recently formed classes for the semi-deaf and semi-mute in Glasgow. As I have dealt with this school in a recent paper, I mention it now only to state that it has just been extended, that there are forty children on the roll and that it continues to receive children who have been in ordinary schools and in schools for the mentally defective, but who have failed to make progress on account of deafness.

A more recent example I take from Bristol, England. In describing a class there which started on April 11, the secretary of the Bristol Education Committee, writing on April 4, states: "There will probably be about 10 or 12 children in attendance. Some of them will be children now at the deaf institution who are semi-

deaf, but have a certain amount of spoken language, and a few others will be children who are now attending our special school for defective children, but whose backwardness is thought to be due to deafness rather than to mental deficiency." But the most interesting illustration I can give you is from London, where another class for hard-of-hearing children is being started this month, and I am indebted to Dr. MacLeod Yearsley, aurist to the London County Council Schools, for the following figures contained in a letter dated April 4:

"Since January 18, 1910, I have once a week attended at the head office examining children sent up to me as deaf. The results are as follows:

"Fit for ordinary schools	87
"Fit for ordinary schools, front row	43
"Hard of hearing	34
"Deaf school	36
"Mentally defective	8
"Total number examined	208"

These figures might be made to point to various conclusions. The one of interest to us here is that clinical examination is essential to any correct placing of deaf children. All of the children were sent up to the specialist by teacher or doctor as deaf, and only a bare majority had any considerable deafness at all.

I must now revert to an aspect of the subject which I have postponed until the question of classification had been considered. *Is there anything about an ordinary deaf-mute child which makes it necessary or even advisable to remove him from his home and educate him in an institution?* I have already answered this question so far as it applied to the semi-deaf and semi-mute by saying that he should not associate with the deaf and dumb at all. I shall now answer it for the mentally defective deaf child by saying that there is good reason for removing him from his home and educating him apart, and I would extend his period of residence in some kind of institution to the end of his life, for two reasons: 1. He will never be self-supporting. 2. If you let him out he will beget other mentally defective children.

The question is thus simplified or narrowed down to this: *Should the ordinary deaf-mute—subject of what I have called surdism—the child who is so deaf that he is also dumb—be removed from his home, and merely because of his deafness be made to associate*

with other deaf children during the whole of his waking hours? To this question I answer *NO*. Such a child should attend a day school for deaf children, and when his school work is over he should go home, or if his home be too far off, he should be boarded out in a selected household near the school. This plan preserves the family life of the deaf child, or where this must be broken, supplies the best substitute. Further, it gives the orally taught deaf child the best chance of practicing what he has been taught in class. Outside the class-room he is in a world where he is induced to use all the speech he has. On this subject I quote Hartmann: "It must be said that the influence of parental love upon the mind, the morals and the character of the child living at home is a boon for which no substitute can be found in an institution. In this respect all children, deaf-mutes as well as others, are situated alike, and I consider the influence of the family life upon the child of such importance that for this reason alone I would prefer a good school to which deaf-mute children, living at home, may be sent, to a large institution in which the children reside and are trained by their teachers."

Instead therefore of deafness being a reason for sending a child to an institution it is physiologically considered a reason for keeping him out of an institution. The massing of deaf children tends to make them a race apart and during their most receptive period deprives them of that contact with the world which is really an essential part of education. Within recent years education committees have taken in hand the feeding, bathing, clothing and drilling of hearing children, and if these committees will do all this for deaf children it will no longer be necessary to mass them together in institutions.

I have told you that I believe we have entered the third period in the education of the deaf child—the clinical period. The great feature of this period will be the classification of deaf children on a clinical basis. It will involve both an extension and a limitation of oralism. Where oralism is taught at all it will be taught thoroughly and unmixed. The period will also see an extension of the day-school system and the restoration of most deaf children to family life, and it will see a larger number of the deaf than heretofore removed from the smaller world of the deaf and dumb and placed in the greater world of the hearing as capable and helpful citizens. Two great legislative movements—the free and compulsory education of deaf children and the medical inspection of school children—have made for the inauguration of this clinical period.

The changes I have outlined can only happen gradually, and, if there be undue haste, mistakes are sure to be made. Graser's mistake of the third decade of the nineteenth century is likely to be repeated; deaf children will, after a short mechanical training in the elements of speech, be put into ordinary classes with hearing children and taught by teachers who are not fully qualified in this special branch of work. Graser's system failed and must always fail. Not only does the deaf child need special training for the full school period of ten or twelve years, but the teacher must be fully equipped for this special work. Then the classes must be so small that the teacher is able to devote time to each individual child. With these precautions the success of the day-school for the deaf is assured, and the cost will be little over half that of the institution system.

It having been ascertained that a child is, or has become, deaf, when should his education begin? My answer is, as soon as the discovery is made. And, in a young deaf child, the first teacher should be the child's mother. That is the case with hearing children. The teacher of the hearing child finds much of the spade-work done. The mother has taught the child to speak, and the acquired and understood vocabulary gives the teacher something which he can use at once in getting educational advancement.

But the mother of the deaf child has been able to do nothing for the child. In the case of the hearing child the mother's work is so nearly perfect in speech-reading that all the teacher has to do is to correct some baby language in which perhaps the mother took a silent pride, but in the deaf child there is not even the skeleton of words, and, although the instinct to speak be present, there is no speech habit.

I see that the National Association of Teachers of the Deaf in Britain has issued a circular to parents and guardians of deaf children, which attempts to guide the mother in creating or perpetuating the speech habit. Were the mother of the deaf child invited to visit periodically the school for the deaf and to see the teacher at work, I think the deaf child might arrive at school, say at five years, much better prepared for the work of the class than he is at present. The instinct to speak might be made to become a speech habit and, although the articulation might be faulty or the results unrecognizable, the mistake could be corrected like the baby speech of the hearing child. If you will study the circular to parents you will see what a difficult task is set to the mother of a little deaf

child, and how much she needs the help which can only be given by watching the skilled teacher do the difficult work. You who teach the deaf to speak know how difficult this work is. I entirely approve of this circular to parents as a guide to mothers who would have their children speak, but without some practical help the mother will make no use of it.

How is this practical help to be given? By following the mother's plan with the hearing child. From the earliest months the mother trains the child to look to her face, and especially her mouth, for meaning. If the deaf child's mother only knew a little of how it was done in the oral schools she might train her child to look to her face, and especially to her lips, for that which even without sound is speech. The circular I refer to indicates the way. To make the teaching of the circular effective two things are necessary. 1. The notification of the occurrence of great deafness or of the discovery of great deafness in a young child. The health visitors of the sanitary authorities might here co-operate with the school board or education committee. 2. The opening of the day schools for the deaf to the mothers of the little deaf children on one day in the month so that they may have some instruction in the cultivation of the speech-habit in the little children who in two or three years must become the pupils in these schools. Should this plan not succeed, nursery schools for little deaf children should be formed and mothers encouraged to witness the teaching.

If oral methods are to succeed fully they must begin early. Could you keep a hearing child from starting speech till the age of five years, I do not think the development of speech or even of language would be rapid or satisfactory, and I cannot but believe that neglecting the speech habit in deaf children till they are 8, 7, 6, or even 5 years of age is a grave mistake. On the other hand, the removal of little deaf children from the home at 2 and 3 years of age is a practice I cannot recommend.

I now quote from a letter sent me by an eminent English teacher of the deaf, Mr. Story: "In my opinion the failure of oral teaching is, in the majority of cases, because it was begun too late. Five years even is not early enough in life for full oral success. The work should begin at five months, rather, by the mother talking to the child and setting up the idea of looking to the mouth for meaning. The mothers must be the first teachers if oral work is to succeed." If Mr. Story is correct we must give the mothers some practical help in the doing of this difficult work.

In order to focus attention on and to facilitate discussion of the chief points raised in this paper, they may be expressed in these propositions: 1. The education of deaf children without previous clinical examination and classification is wasteful and inefficient. 2. The massing of deaf children in institutions should be avoided except in the case of the mentally defective deaf. Necessitous deaf children should be fed, clad, and, when necessary, boarded out at the expense of the educational authorities. In these respects they need the same treatment as necessitous hearing children. 3. The education, but not the instruction, of deaf children should begin as soon as the fact of deafness is known, and the mothers should be the first teachers. Unless the speech-habit be acquired before the age of five years the best oral results can seldom be got.

If the physician and the teacher are to co-operate in the work of educating the deaf child, there must be not only medical inspection of all school children, but there must be a specialist attached to every school or institution for the education of the deaf. The best man for this work is the aural surgeon, and even the aural surgeon must study the deaf child long and carefully before he can understand this strange creature without hearing, without speech; this half-animal, half god, who by education may be made a man, with no evidence of that which stamps man more than anything as higher than the lower animals—the power to receive and communicate his thoughts. But as year after year he sees further into the patient, waiting spirit, and as year after year he sees this spirit set free, he will be rewarded by the highest that is given to our profession—love; not mere pity, but an intelligent and helpful love for these little ones who cannot help themselves. Thus will the physician share a privilege which has been too long the exclusive possession of the teacher of the deaf.

650 Shields Road, Pollokshields, Glasgow.

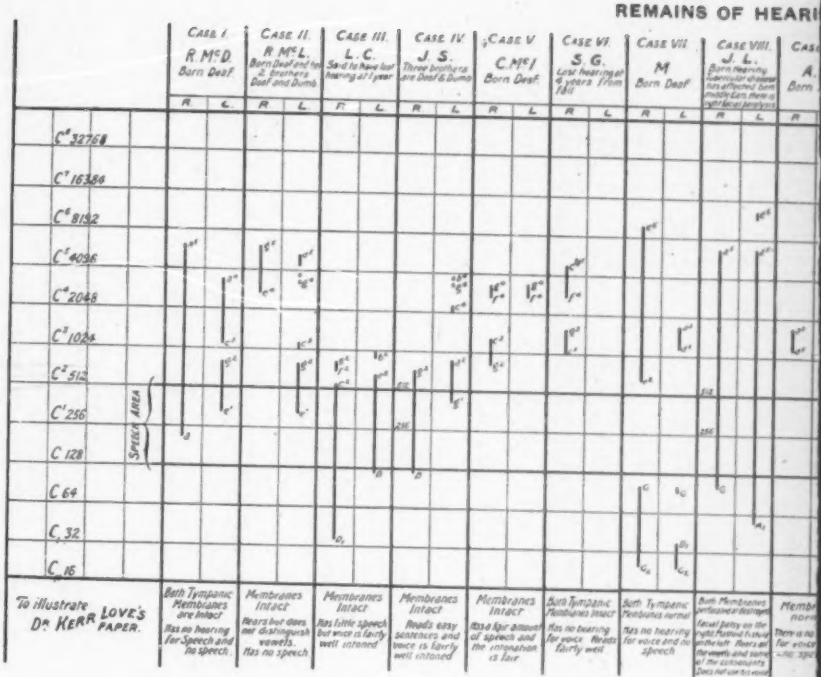
In connection with the above paper, Dr. Love made public the following letter from Helen Keller:

Wrentham, Mass., March 31, 1910.

My Dear Dr. Love:

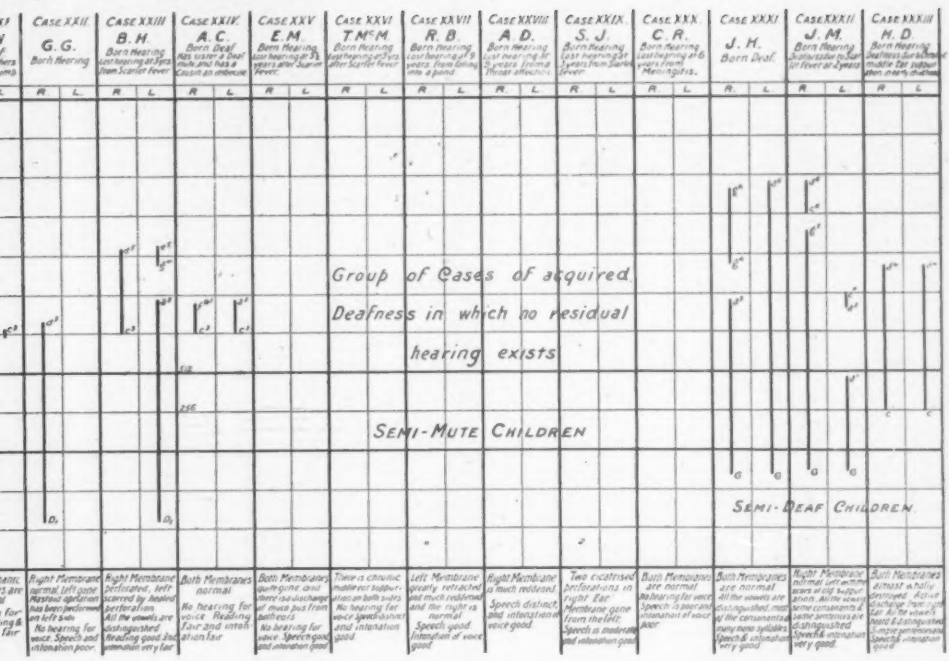
I am glad that the physicians who meet in Washington are to consider the deaf child. Surely much good will result from a conference between teachers who have to deal with the deaf child as a pupil and physicians who understand the pathology of deafness. It will be a great step forward when the physician takes part in the work for defectives who have hitherto been entrusted wholly

REMAINS OF HEARI


Case I. R. McD. Born Deaf.
Case II. R. McL. Born Deaf and his 2 brothers Deaf and Dumb.
Case III. L. C. Said to have lost hearing at 1 year.
Case IV. J. S. Three brothers are Deaf & Dumb.
Case V. C. McI. Born Deaf.
Case VI. S. G. Lost hearing at 4 years from fall.
Case VII. M. Born Deaf.
Case VIII. J. L. Born hearing. Tubercular disease of Petrous bone, middle Ear, there is right facial paralysis.
Case A. Born
R
L
C 32768
C 16384
C 8192
C 4096
C 2048
C 1024
C 512
C 256
C 128
C 64
C 32
C 16
SPEECH AREA
To illustrate Dr KERR LOVE'S PAPER.
Both Tympanic Membranes are intact
Has no hearing for Speech and no speech.
Membranes Intact
Hears but does not distinguish vowels.
Has no speech.
Membranes Intact
Has little speech but voice is fairly well intoned
Membranes Intact
Reads easy sentences and voice is fairly well intoned
Membranes Intact
Has a fair amount of speech and the intonation is fair
Both Tympanic Membranes Intact
Has no hearing for voice. Reads fairly well.
Both Tympanic Membranes normal
Has no hearing for voice and no speech
Both Membranes perforated & destroyed
Facial palsy on the right. Partial ptosis on the left. Hears on the mouth and some of the consonants. Does not use his voice
Membr
Norm
There is no
for voice
and speech

NG IN DEAF-MUTE CHILDREN. The position and extent of the islands of hearing influence the speech a

Case IX. M Deaf	Case X. A.M Born Deaf.	Case XI. J.G Born Hearing, became Deaf at 4 years from Measles.	Case XII M.S. Said to have lost hearing at 13 year	Case XIII C.McL. Both Deaf, other 2 children family are Deaf and Dumb	Case XIV C.A. Born Hearing Lost hearing at 2 years	Case XV. E.G. Born Hearing Deafness due to Fever at 2½ years.	Case XVI W.B. Born Deaf, other 2 in family are Deaf & Dumb	Case XVII A.C. Born Deaf and has a Deaf-mute Cousin	Case XVIII S. S. Born Deaf.	Case XIX D.McA Born Deaf and has 2 Deaf-mute sisters in the Institution.	Case XX A.Y. Said to have lost hearing at 10 mos. from Meningitis.	Case XXI R.McN Born Deaf. Brother & father uncle Deaf & Dumb.	Case XXII G.G. Born Hearing
L	R L	R L	R L	R L	R L	R L	R L	R L	R L	R L	R L	R L	R L
anes ial hear- ng and ch.	Membranes normal Distinguishes A Articulates fairly well and the intonation is good	Most of the Tympanic Membrane is gone on both sides No hearing for voice for read with fair distinctness, and intonation good A Semi-Mute	Membranes normal Distinguishes A & O Reading good and intonation of voice good	Both Membranes are normal Does not distinguish vowels, Reads fairly well Intonation is good, for low tones good, for high tones bad	Right Membrane perforated, left seems normal Distinguishes all vowels but e Reading is fair, intonation good	Right Membrane almost gone, left intact, but with cheesy deposit Distinguishes A O and Hiccoughing Speech fairly correct Intonation is good	Tympanic Membranes intact Speech is fair and intonation of voice fair Does not hear voice.	Tympanic Membranes normal Speech poor and intonation poor Does not hear the voice	Both Tympanic Membranes are normal There is but slight hearing for voice Speech is faint, voice is pitched high but fairly attuned	Both Tympanic Membranes are normal Hearing for voice is doubtful Speech is poor and the intonation of voice is poor	Possibly the Scar of an old perforation in the upper part of the left Membrane No hearing for voice Speech poor voice high and squeaky	Both Tympanic Membranes are normal No hearing for voice Reading & intonation fair	Right Membrane normal Left gone Mastoid operation has been performed on left side No hearing for voice. Speech and intonation poor.


Case XXII
G.G.
Born Hearing
Case XXIII
B.H.
Born Hearing
Lost hearing at 3yrs
from Scarlet fever.
Case XXIV.
A.C.
Born Deaf
Has worn a Deaf
aide and has a
Course on Intensive
Case XXV
E.M.
Born Hearing
Lost hearing at 2½
years after Scarlet
Fever.
Case XXVI
T.McM.
Born Hearing
Lost hearing at 3yrs
after Scarlet Fever
Case XXVII
R.B.
Born Hearing
Lost hearing at 3½
years from falling
into a pond
Case XXVIII
A.D.
Born Hearing
Lost hearing at
3 years from
Throat affection
Case XXIX.
S.J.
Born Hearing
Lost hearing at
3 years from Scarlet
Fever
Case XXX
C.R.
Born Hearing
Lost hearing at 6
years from
Meningitis.
Case XXXI
J.H.
Born Deaf.
Case XXXII
J.M.
Born Hearing
Scattered to Earth
for Fever at 2 years
Case XXXIII
H.D.
Born Hearing
Deafness due to Scarlet
middle Ear suppur-
ation, earth shattered
R
L
Group of Cases of acquired
Deafness in which no residual
hearing exists
SEMI-MUTE CHILDREN
SEMI-DEAF CHILDREN.
Right Membrane
normal Left under
Mastoid operation
has been performed
Left Side
No hearing for
voice. Speech and
intonation poor.
Right Membrane
Perforated, left
scarred by healed
perforation.
All the vowels are
distinguished
Hearing good. Into
nation very fair
Both Membranes
normal
No hearing for
voice Hearing
Fair and into
nation fair
Both Membranes
Quite white and
there is discharge
of muck pus from
both ears
No hearing for
voice. Speech good
and intonation good
There is chronic
middle ear suppur-
ation on both sides
No hearing for
voice. Speech short
and intonation
good
Left Membrane
greatly retracted
and much reddened
and the right is
normal
Speech good
Intonation of voice
good
Right Membrane
is much reddened
Speech distinct,
and intonation of
voice good
Two cicatrised
perforations on
right Ear
Membrane gone
from the left.
Speech is moderate
and intonation good
Both Membranes
are normal
No hearing for voice
Speech is poor and
intonation of voice
poor
Both Membranes
are normal
All the vowels are
distinguished, most
of the consonants &
many more syllables
Speech & intonation
very good
Right Membrane
normal Left with
scars of old suppur-
ation. All the vowels
some consonants &
easier sentences are
distinguished
Speech & intonation
very good
Both Membranes
almost wholly
destroyed. Active
discharge from right
Ear All the vowels
heard & distinguished
Simpler sentences
Speech & intonation
good

to teachers in schools. I have heard of children who were under medical treatment and who were allowed to remain in ignorance for years—that is, the doctor tried to do something for the diseased organ, but he gave the parents no practical advice about the deaf child. I have received letters from the parents of children who were either deaf or feeble-minded, the parents could not say which. The doctor did not know or else he did not tell them the truth. I do not wish to complain of the great brotherhood of physicians. I believe with Stevenson that a physician "is the flower of our civilization." We look to him not only to alleviate blindness and deafness, but also to teach us how to prevent these dark infirmities. Now we greatly need information gained by unbiased scientific study of the deaf child and we are asking that the physician tell the public the truth—that is, as much truth as he knows.

As you say, most of my little work has been done for the blind. But that is largely an accident. Workers for the sightless have asked me to help them, and have given me many opportunities to say a word on their behalf. Perhaps the reason that I have done little or nothing for the deaf is, I am not competent. I hardly know where to take hold of their work. But I am deeply interested in them. I am just as deaf as I am blind. The problems of deafness are deeper and more complex if not more important, than those of blindness. Deafness is a much worse misfortune. For it means the loss of the most vital stimulus—the sound of the voice, that brings language, sets thought astir, and keeps us in the intellectual company of man. Respectfully yours,

HELEN KELLER.

650 Shields Road, Pollokshields.

Diphtheria. WM. D. BLACK; *St. Louis Med. Rev.*, April, 1910.

Beside a diagnostic paralleled table of croup, tonsillitis, faucial diphtheria, laryngeal diphtheria, membranous croup and spasmodic croup, Black gives the differential diagnostic features between nasal diphtheria, fibro-plastic and croupous rhinitis. It cannot be here detailed. Diphtheria of the ear, external and middle, is also described briefly.—EATON.

THE PHYSIOLOGY AND PSYCHOLOGY OF HEARING WITH SPECIAL REFERENCE TO DEVELOPMENT OF SPEECH.*

BY G. HUDSON-MAKUEN, M. D., PHILADELPHIA.

In the time allotted to the opening paper of this symposium, only the briefest resumé of the more generally accepted views on the subjects suggested by the title will be at all possible, and no attempt will be made to discuss their plausibility or to add to their number.

While the anatomists are still at variance with reference to certain complicated structural peculiarities of the inner ear, physiologists may be excused for their lack of agreement with reference to the precise functions of these structures.

The anatomy of the external and middle portions of the ear is well established, and likewise there is no difference of opinion as to the physiology of hearing so far as these particular structures are concerned. We have the so-called sound-waves, generated and set in motion by the sounding body, collected and condensed by the auricle, conducted through the external auditory canal to the tympanic membrane and thence by means of the ossicular chain and other contents of the middle-ear to the oval window through which they pass to the fluids of the labyrinth.

It is from this point in the inner ear that we must begin to theorize. How are the sound-waves transmitted from the labyrinthine fluid to the auditory nerve, and what particular changes take place in them during this transmission? Helmholtz was the first to offer any definite solution to these problems and for many years his resonance or piano-string theory was accepted as being the most satisfactory. At first he thought that the rods of Corti respond to different notes as do the strings of a piano, but when it was shown that some animals have no rods he transferred this function to the fibres of the basilar membrane. It was supposed that this membrane, because of its position and peculiar structure, served the purpose of receiving the sound-waves, selecting them according to their adaptation to its transverse fibres which increase in length from the base of the cochlea to its apex, that the high

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

tones were perceived by the shorter fibres at the base and the lower ones by the correspondingly longer ones toward the apex, and that the responsive vibrations were taken up by the hair cells resting upon the membrane where they are changed into impulses suitable for conduction by the auditory nerve to the hearing center of the brain.

This was an ingenious theory but it has not stood the test of time, for neither in its structure nor in its size has the basilar membrane been found to meet the requirements which Helmholtz imposed upon it. The transverse fibres are not sufficiently numerous to produce the range of pitch that the human ear is capable of perceiving, and their disposition in relation to the longitudinal fibres and various blood-vessels makes it physically impossible for them to vibrate after the manner of piano strings. Moreover it has been found that the membrane does not extend to the lowermost part of the cochlea and that the hair cells in this region do not come in contact with it and therefore cannot transmit its vibrations to the neuro-epithelial cells, where they are supposed to be transformed into nerve impulses.

This latter objection to the piano-string theory seems also to be opposed to the so-called telephone theory which regards the basilar membrane as a kind of second drum membrane between which and the tectorial membrane so-called "pressure-patterns" are made which impart their vibratory motions to the hair cells. This theory supposes that the analysis of tone or the perception of pitch takes place in the cerebral cortex, while the piano-string theory locates this function in the cochlea.

In addition to the anatomical objections to the two basilar membrane theories which I have mentioned, there seem to be good phylogenetic, ontogenetic and histological reasons for the entire abandonment of this membrane as a conspicuous factor in the transmission and perception of tone and for the substitution of the tectorial membrane in its stead. On account of the extreme delicacy of the tectorial membrane, however, the difficulties of demonstrating absolutely the exact manner in which it performs this function, are almost insurmountable, and we can only say that it appears in all respects to be better adapted to the functions which have been described.

Again it is said that the tectorial membrane is merely a conglomeration of sensitive hair cells and that they respond to the sound-waves of the endolymph somewhat as a field of grain responds to the blowing winds.

It will be observed that there is still a difference of opinion as to the exact location of the perception of tone, but the evidence seems to be strongly in favor of its peripheral location with a central representation of its final analysis.

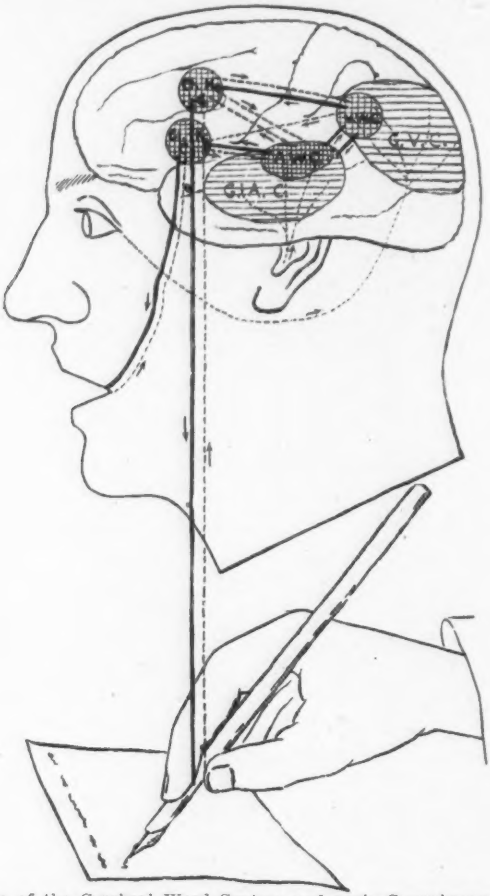


Diagram of the Cerebral Word-Centers and their Commissures.
Gl. K. C.—Glosso-Kinesthetic Center; Ch. K. C.—Chiro Kinesthetic Center
A. W. C.—Auditory Word-Center; G. A. C.—General Auditory Center;
V. W. C.—Visual Word-Center; G. V. C.—General Visual-Center.

It is not enough for the so-called sound-waves to be transmitted in regular order through the peripheral organs of hearing and to be converted into nerve impulses, but for speech purposes, these impulses must be taken up by the central mechanisms and con-

verted into characters or symbols which may enter into consciousness and be intelligible to the individual. We have, therefore, in the cerebral cortex regions or centers, as they are called, in which sensations transmitted through the auditory nerve are deposited and registered, and different kinds of sounds, after frequent repetitions, come to be recognized by the character and individuality of their sensations. For this final analysis of tone, therefore, we have in the brain bilateral centers in which all the auditory impressions are received, and an adjacent associated unilateral center in which only word-images are received and registered. The first are called the primary or general auditory centers, and the other, the more specialized word center.

The location of the centers for the hearing of sounds is in the region of the first temporal lobe on either side, but the center for the registration of word images is developed only on one side of the brain, the left side in right-handed, and the right side in left-handed persons.

The auditory word center is developed in a manner somewhat similar to that of the making of phonographic records, but, of course, these living centers are far more delicate and sensitive than mere metal plates, and it requires almost an infinitude of repetitions of sounds to make them reach their highest efficiency.

The auditory word-center, therefore, is of slow development and from small beginnings. It follows, of course, the development of the primary auditory center, and to some extent also the development of the motor or glosso-kinesthetic center. A child must hear sounds before he can understand them, and he must be able to produce words before he can hear them accurately. Speech at first, therefore, is largely automatic and reflex, but as the child grows intellectually and slowly begins to associate certain of the words which he hears and which he himself uses automatically, with certain appropriate individuals or things, the higher intellectual centers of the brain assume control of the lower and hitherto reflex centers, and the increase of the child's vocabulary depends upon the number of new word-images which are developed daily in his auditory word-center.

Hearing, therefore, is a matter of education. The child is not endowed at birth with this faculty. If he were born into a world of silence, there would be no development of hearing, and if he were afterward quickly ushered into a world of action and of speech, he would have to learn to hear just as he would have to

learn to speak. The development of hearing is contingent upon certain subjective and objective physical conditions. There must be sounds to hear, and there must be a certain amount of development in the various mechanisms employed before there can be any hearing. The sensory nerves have no power to functionate until they have developed myelin sheaths or until they have become medullated, and of all the various afferent nerves the auditory nerves are the last to become thus endowed, and to take upon themselves their full quota of function. Congenitally, therefore, the child may have all the primary essentials to the faculty of hearing and yet be developmentally deaf. In other words, arrested development may be a causal factor in deaf-mutism.

While the ear is the most important avenue to the brain for speech purposes and while its integrity is absolutely essential to spontaneous speech development, two other supplementary avenues, namely, the visual and tactile, are used far more than is generally supposed. The importance of vision as a factor in the development of speech is shown by the fact that blind children are somewhat slow in the acquirement of speech, and also by the fact that when the eyes are closed many words are lost either in a general conversation or when listening to an address.

The tactile avenues to the brain are important also, for without the sense of touch we can have no kinesthetic centers whatever, and the acquirement of speech would be quite impossible.

The cortical speech-centers, therefore, may be summed up as follows: The auditory and the glosso-kinesthetic, comprising the so-called primary couplet, in the one of which are stored auditory word-images, and in the other memories for the articulatory movements in the production of speech, and the visual and chiro-kinesthetic centers in which are stored the visual images of written and printed words and memories for the movements of the hand in writing.

To normal speech development the auditory center is indispensable, but its function is supplemented by the visual and tactile centers. In the blind child the visual center is undeveloped and we have substituted the tactile centers in which are stored word-images or memories revived in reading. In the deaf child the auditory center is undeveloped, and when he is taught to speak we substitute for the auditory center the visual word-center in which are stored memories of articulatory and other expressional movements of the face and body. In the child who is both deaf and blind, the

acquirement of speech must be through the tactile avenue, supplemented to some extent perhaps by the gustatory, olfactory and possibly other avenues to the brain, and his success, of course, will depend upon his psycho-physical ability to overcome serious handicaps.

The cortical centers in the so-called zone of language are somewhat analogous to the tools in a carpenter's shop. The carpenter can do his best with a full kit of tools, but fairly good work is not impossible with a limited number, and so an individual may acquire speech and a fair command of language without hearing and sometimes also without seeing.

SUMMARY: The physiology of hearing has been a subject for investigation and study since before the Christian Era began, but Helmholtz was the first to place it upon a scientific basis. Helmholtz' "resonance theory" with slight modifications is the one now most generally accepted. The only important modifications of the Helmholtz theory has been the substitution of the tectorial for the basilar membrane as the resonance body.

Helmholtz located the perception of tone in the cochlea and its final analysis in the cerebral cortex, and with few exceptions physiologists have subscribed to this disposition of these functions.

The importance of hearing as a factor in the development of speech is of later recognition and even now it is not generally understood. Spontaneous speech development takes place only as the individual is capable of hearing speech sounds, both subjectively and objectively, and speech acquired in any other way is a forced and artificial product. A little hearing in the development of speech is better than no hearing at all, and hearing, like speech, may be improved by training.

The eye is the best substitute for the ear in the development of speech, but the tactile and other avenues to the brain may be trained to take the place of either or both under favorable conditions and in case of necessity.

The conditions favoring the development of speech in the absence of important receptive avenues to the brain are chiefly cortical and they are included in the terms intellectualism, attention and volition or will power.

1627 Walnut Street.

THE CLINICAL ASPECTS OF DEAF-MUTISM.*

BY FRANCIS R. PACKARD, M. D., PHILADELPHIA.

In the following remarks, I shall confine myself strictly to the consideration of the problems of deaf-mutism as they present themselves to the aurist, and endeavor to briefly indicate some of the points in which co-operation between the aurist and teacher may prove mutually helpful and of benefit to the patient.

THE CAUSES OF DEAF-MUTISM: Deaf-mutism may be congenital or acquired. Hammerschlag pointed out the fact that it is better to employ the term congenital than hereditary deafness, as true inheritance of deafness from progenitors is rare, compared with congenital deafness resulting from intermarriages between persons in whose families there is a taint of deafness or from consanguineous marriages. There are, undoubtedly, instances of true hereditary deafness; that is of deafness transmitted by deaf-mute parents to their children, but this is by no means so frequent as is generally supposed. The most complete study of the statistics of this subject in America was that made by Fay.[1]. He states that, "Taking the deaf as a whole, without regard to the character of the deafness, marriages in which both the partners are deaf are not more liable to deaf offspring than marriages in which one of the partners is deaf and the other is a hearing person." This is true because cases of true congenital deafness are so much rarer than the acquired, and, of course, the latter is not transmitted any more than any other acquired trait or lesion would be.

Scheppegrell,[2] in his remarkably complete critical summary of the literature on the influence of heredity in deafness, states from a careful study of the statistics from all countries that in only one-third of the cases of deaf-mutism is the deafness congenital, in the other two-thirds it is acquired. This estimate agrees almost exactly with that of Holger Mygind.[3]

Love[4] points out in his work the very important fact that the earlier statistics from institutions on deaf-mutism, and the statistics compiled in the various census reports of most countries, put the number of the congenitally deaf persons at disproportionately large figures, compared with more recent or more carefully compiled sta-

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

tistical tables. In compiling the earlier data, statements of patients were accepted without question. In more recent years, however, careful examinations have been, as a rule, made in institutions, and they have resulted in showing the presence of undoubtedly acquired aural disease in the vast majority of those heretofore classed as congenital cases. As to the causes of acquired deafness resulting in deaf-mutism, we find that all the statistical tables that have been collected from reliable sources are in practical agreement in certain essential points. Thus meningitis or inflammatory cerebral affections and scarlet fever lead the list of causes in all instances in every country or region.

Hartmann's[5] statistics from German sources, those of Bliss[6] from the Pennsylvania Institution for the Deaf and Dumb at Mt. Airy, and those given by Kerr Love from Glasgow, all coincide in their presentation of this matter. Under meningitis, we must include such cases as are stated as due to convulsions, hydrocepholus, and congestion of the brain. It will be noticed that these affections are prevalent amongst children, as are the other diseases to which the origin of acquired deafness resulting in deaf-mutism is generally ascribed, such as measles and diphtheria. In the majority of cases of acquired deaf-mutism, according to Bezold, the hearing is lost in the second year, although the child's deafness is frequently not noticed until it is several years older. Although most authorities agree in stating that, when deafness is acquired before 4 years of age, loss of speech invariably follows, John Dutton Wright[7] believes that a child possessing normal speech even up to 8 years of age, will become a deaf-mute if hearing is lost at that age, unless prompt attention is given to his instruction in speaking.

Hearing-Power of Deaf-Mutes: Increased attention was drawn to the well-known fact that many deaf-mutes had oftentimes considerable remnant of hearing left by the studies of Urbantschitsch, who, in 1893, evolved a system of educational exercises which aimed at evoking this sound-perception and cultivating it as an aid to the education of the patient. Urbantschitsch believes that the deafness in cases of deaf-mutism is due to lack of exercise of its functionating power by the auditory nerve, and that it should be aroused and stimulated by causing it to functionate. Although the practical results of Urbantschitsch's system of exercises are not such as to justify the great expectations formed of them, nevertheless, in some instances, with some modifications, they have proved of great service.

Politzer[8] called attention to the fact that exercises in hearing for deaf adults had been recommended by Philippe as early as 1846, but they were not regarded as having much value. Politzer also refers to the fact that Maloney, of Washington, D. C., in 1893, recommended the otacoustic method of treatment for the purpose of improving the hearing-power, if any existed, of those who were deaf for conversation.

Although I believe that it is now generally conceded that Urbantschitsch's first published investigations led to an extravagant laudation of his method for the cultivation of sound-perception in the deaf, nevertheless, further work on the subject, especially by Bezold, has shown that it possesses distinct value in many cases. Up to the year 1898, Bezold had tested the ears of 276 deaf-mutes, and out of that number but 79 were totally deaf. Director Keller of the Deaf and Dumb Institution of Munich has, since 1898, made practical application of the results of the use of the limited hearing of some of the deaf-mutes in the institution. His results are summed up as follows[9]: "These children command a vocabulary that the totally deaf can never obtain. Their manner of expressing their thoughts is equal to that of hearing people. Their readiness to speak is surprising. Similar results can never be obtained in totally deaf children. They are unattainable to partially hearing children who are constantly instructed, together with their totally deaf comrades. Separation of the partially hearing pupils from the totally deaf ones, and instruction in separate rooms, or if possible in separate institutions, must be our aim."

I am aware that Director Keller's statement will probably not meet with the approval of some teachers, and I am, of course, not qualified myself to pronounce whether it is correct or not. I feel, however, that in such a matter only the most careful study and investigation, undertaken conjointly by the teacher and the otologist, would justify its absolute acceptance or rejection. Director Koller does not believe that hearing is improved by the otacoustic method of instruction, but he thinks the pupils learn to associate words which they have understood by reading the motion of the lips with those which they have been able to perceive by means of hearing.

For the purpose of testing the perception of sound in deaf-mutes, many ways have been employed. Deaf-mutes seldom perceive the tones of the voice or the ticks of a watch, which, of course, are the simplest methods of testing the perception of sound, and resort has

been had to various other appliances. Kerr Love used a large dinner-bell with a spring tongue attached to the junction of the handle and the bell, and so arranged that a violent shake produced a sound of great intensity. He states that a little practice enables the operator to produce sounds of very uniform loudness. Urbantschitsch used a harmonica with a range of six octaves. Scheppegrell used for his testing, a snapper similar to that used in teaching pupils telegraphy, but of a larger size, and a whistle of high pitch which contained a ball to change the vibrations, and a series of automatic bells varying in pitch and made somewhat like those used on bicycles. He stated that with these tests he had been able to demonstrate hearing in cases that other aurists had pronounced totally deaf. Edelmann's weighted tuning-forks are probably the most accurate instruments used to ascertain the exact limits of sound-perception. The Galton whistle is also useful, especially for the purpose of eliciting the perception of the higher tones. Kerr Love agreed with De Rossi in the following conclusions, which he thus states:

1. Total deafness is not common amongst deaf-mutes. To aerial sounds not more than 15 or 20 per cent are quite deaf, sometimes only 7 or 8 per cent; to bone-conduction sounds even a smaller number.

2. Hearing for speech is pretty common. It exists to a usable extent in 25 or 27 per cent of deaf-mutes, and from 10 to 15 per cent are only semi-deaf. Under the finger-method of teaching these become rapidly deafer, and soon totally dumb. The oral system may do something to prevent this, but it can only be properly dealt with by the acoustic method.

3. Cranial conduction exists in almost all cases, and a large vibrating tuning-fork is almost always heard in this way. It is also heard in the majority of cases by aerial conduction.

Pathology of Deaf-Mutism: Holger Mygind and others have compiled the records of autopsies held upon deaf-mutes, so that our knowledge of the pathological conditions present in the ears of those who have suffered during life, from either congenital or acquired deaf-mutism, is now very complete. The lesions found have, as might have been expected, been of indefinite number and variety. In the congenital cases, malformations or lack of development of the bony or membranous labyrinth, or of the auditory nerve, are probably the most frequently found conditions. In the acquired cases, the results of suppurations in the middle-ear or in the labyrinth, or the pathological changes produced by inflammation of the

meninges are more common. In cases of acquired deafness, there is often found an atrophy of the nerves and centers concerned with audition, due to lack of their functionating power. Thus in the case of Laura Bridgman who was blind and a deaf-mute, and had also lost the sense of smell, as the result of scarlet fever in infancy, Henry H. Donaldson[10] reported as follows:

"The anatomical condition was that of a normal brain in which the olfactory bulbs and nerves, the optic nerves, and possibly the glosso-pharyngeal, had all been more or less destroyed at their peripheral ends. This destruction caused a degeneration—most marked in the optic nerves—which extended towards the centers and involved them indirectly. This condition has left its mark more or less plainly on the whole brain, as indicated by the extent and thickness of the cerebral cortex, and especially by the cortex connected with these deficient sensory nerves. The physiological effect of the peripheral lesions, as I conceive it, was to retard growth in the centers, cortical and subcortical, which were thus involved, and also to interfere with, if not entirely prevent the formation of the association tracts."

Of course, there is a distinct class of cases in which the power of speech is lost because of a lack of cerebral development, or because of meningeal or cerebral disease in infancy. These unfortunate patients are not, as a rule, deaf, although they are frequently unable to appreciate ordinary sounds. Their deafness is psychical and increases because of lack of training and the disease of any perception of sound they may have.

TREATMENT: I believe that enough emphasis is not placed upon the thorough examination of every child, by a competent aurist, before he is placed in any institution and considered solely as a subject for instruction. Many cases undoubtedly occur in which ears are allowed to go on suppurating, or chronic catarrhal conditions are permitted to continue, because of lack of proper examination. Adenoid growths in the naso-pharynx, or diseased conditions of the faucial tonsils, constituting sources of obstruction to the Eustachian tubes, or of infection and re-infection of the middle-ear, should be removed by operation. When suppuration in the ears will not yield to conservative treatment, the radical mastoid operation should be performed. Much could be done, if not to aid the hearing, at least to add to the physical comfort of the patient, and it should be kept in mind that, at the present time a chronic discharge from the ear is regarded as a source of danger to the pa-

tient's life, because of the risk of mastoid, meningeal or sinus involvement.

The labyrinthine condition in deaf-mutes should also be examined. Alexander and Mackenzie[11] have recently made a most valuable and interesting contribution to this aspect of the subject, reporting the results of their examinations of the pupils of the K. K. Taubstummen Institute in Vienna. Many deaf-mutes suffer greatly from vertigo and nystagmus, with disturbance of equilibrium, due to labyrinthine disease. With our recently acquired knowledge of the functions of the static and acoustic labyrinth, such investigations would not only be helpful to the patient, but would also yield results of the greatest scientific value.

BIBLIOGRAPHY.

1. FAY: Marriages of the Deaf in America, 1898; published by Volta Bureau.
2. SHEPFEGRELL: *Am. Jour. of Med. Sci.*, Vol. 19, page 184, 1900.
3. MYGIND: Deaf-Mutism, 1894.
4. LOVE: Deaf-Mutism, Glasgow, 1896.
5. HARTMANN: Deaf-Mutism, 1880.
6. BLISS: *Med. News*, Aug. 10, 1889.
7. WRIGHT: *Jour. A. M. A.*, Dec. 25, 1909.
8. POLITZER: Text-Book of Diseases of Ear.
9. BEZOLD and SIEBEMANN: Text-Book of Otology, 1908—Holinger's translation.
10. DONALDSON: *Am. Jour. of Psychol.*, Vol. 3 and 4, 1890 and 1891.
11. ALEXANDER and MACKENZIE: Functional Examination of the Organ of Hearing in Deaf-Mutes. *Ztschr. f. Ohrenh.*, Vol. 54, No. 2, 1908. Translation published in *Arch. of Otol.*, Vol. 37, No. 6, 1908.

304 South Nineteenth Street.

Diphtheria from the Medical Standpoint. RODNEY J. BUNCH *St. Louis Med. Rev.*, April, 1910.

Indiscriminate injection of anti-toxin is not to be followed. Immunizing injections are generally indicated. The problem of disinfection and disinfectants is a most important one, and annihilation of the bacteria is essentially a precedent to all treatment. Formaldehyde or some lysol preparation is at present the best, and our chief reliance.—EATON.

THE PHYSICIAN AND THE DEAF CHILD.*

BY MAX A. GOLDSTEIN, M. D., SAINT LOUIS.

The problem of "Child Study" has received so general and constant an impetus from medical, pedagogical, sociological and psychological sources in the past decade that the literature, data and subject-matter resulting from the many energies brought to bear on this question have become so voluminous and replete with theories, suggestions and plans, that it may now be an exceedingly difficult task to evolve a practical solution out of this scientific chaos.

It is a fact of great significance that the medical fraternity, educators, women's clubs, mother's circles and almost every organization, large and small, which has the interest of the education and development of the growing child at heart, has been seriously occupied with this all-important subject.

A recent writer[1] has aptly said: "Child culture has absorbed society to such a degree that I fear it has lost its dignified, scientific prestige." Another popular writer in this field states: "What the average child needs nowadays is 'a little wholesome neglect.' He is studied and absorbed and cultivated until he cannot take a long breath and take it naturally." Again, "The one thing on earth that needs to be stamped out, and stamped out quickly, is the American fad of child culture and child study."

In our efforts and our over-zealous energy to solve this question our American child has unfortunately received an over-dose, and, like over-doses in medicine generally the result will not prove fatal, and we believe that the intelligent co-operation of physician, teacher and parent will soon lay a healthy foundation on which this vital structure may be carefully and rationally built.

The task has been assigned to me to analyze the relations of *the physician to the deaf child.* I have subdivided this theme into three sections: I, The Civic Status. II. Professional Activities. III. Personal Equation.

I. THE CIVIC STATUS.

The physician is an important factor in the responsibilities assumed by the community toward the education and training of the

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

deaf child. The teaching of the deaf child along lines of recent research and scientific accuracy is a comparatively new field of work. Parents of children with congenital or acquired deafness have generally but little knowledge concerning schools and teachers for these little unfortunates, and appeal to their family physician for advice. He is perhaps the first to be consulted by the family as to the proper disposal of these defective children. It is surprising then to realize how poorly informed the general practitioner has been in the past in such matters. Let it be said to the credit of our American otologists that they have contributed much toward the edification of the general practitioner in this work. Those who specialize in otology and whose relations to children with defects of speech and hearing are more intimate, are constantly seeking data and information by which the general medical body and the community at large must profit, and we must look especially to their influence for the readjustment of the problems concerned with the training of these children.

Among the responsibilities which must be assumed by us is the introduction of proper measures and bills before Local and State Boards of Health, School Boards and Legislative bodies; the enactment of reforms which shall have for their purpose the segregation of defective children in the public schools; the systematic examination of all public school children for all defects of sight, speech and hearing; the selection of qualified teachers for such children and the elimination of all political influence from such educational reforms.

The otologist here becomes the adviser of the family physician and the counselor of the teacher; the family physician, together with the teacher, instruct the parent; the parent, profiting by these revisions and reforms in the education of defective children, is then placed in a position to act as a more intelligent guide to the child.

Many of the wheels of this intricate and scientific educational machinery have already been set in motion at home and abroad; legislation has been enacted in many communities whereby the larger educational institutions, especially the public schools, are brought under more careful scientific observation and control. Reports are coming in from every quarter where systematic examinations of the organs of sight, speech and hearing of each child are made, where the results of all defects are recorded and where active measures are taken to remedy such defects.

It requires no great depth of thought to observe that when all large communities in this broad land have been enlisted in such a cause and when each contributes his quota to the general good and welfare, the final outcome will be a surprising decrease in some of the most marked infirmities of child development. There are in the United States over fifteen million school children. Even in the records thus far gathered[2] it was found that three per cent of the children examined had some form of impediment in speech; over twenty per cent had impaired hearing, and from forty to fifty per cent impaired sight. It must be observed that these tests were all made in the simplest manner possible, and where defects were found they were mainly of the most apparent form. It may be of interest to note that the more highly intellectual the race and the closer the application to study, the greater the tendency to such defects. These and many other observations constitute the chapter on the civic status in which the physician must concentrate his energies and offer his active support.

II. PROFESSIONAL ACTIVITIES.

Medical science in its relations to defective children has undergone a tremendous evolution in the last two decades. When the venerable discoverer of adenoid vegetations, Wilhelm Meyer, of Copenhagen, presented his exhaustive thesis before the British Medical Association in 1870, describing the nature and results of adenoid growths, their influence on the physical character of the growing child, their tendency to stunted bodily development, to deafness and to mental progress, he conferred not only one of the greatest boons to the progress of medical science, but also one of the most valuable contributions to the advancement of the human race. The medical fraternity first received this startling discovery with surprise and incredulity and it has required more than a quarter of a century to convince not only our profession, but educators, parents and the community at large as to the importance and significance of these observations. To-day we know that our institutions for the deaf were at one time filled with a large percentage of children whose original sources of deafness depended on the presence of this lymphoid pathology in the pharyngeal vault.

How large a percentage of defects of speech and hearing is still due to the influence of such a pathology we shall be better enabled to determine when the systematic examination of all school children in the length and breadth of the land has been completed.

Much has already been accomplished by the profession to stamp out this prevalent cause of deafness, yet our labors in this direction have but begun.

Let us select at randum one of these defective children as he is brought to our notice, following the results of the examination in our public schools. Frequently he will be a poor child of foreign birth, pale and emaciated in body, badly nourished, undersized, flat-chested and dull of comprehension, all indicative of insufficient care and nourishment, of poor hygienic surroundings, of local pathologic entities and constitutional dyscrasias. He may present evidence of physical mal-nutrition, expressed by an unusually stupid countenance and bulging eyes, the result of enlarged tonsils or adenoid growths, which prevent proper nasal respiration and produce improper oxygenation and lung expansion. This is a picture of the catarrhal type, which eventually produces deafness because of nasal or throat obstruction and is also often the precursor of many forms of speech defects.

This child acquires an education under tremendous difficulties. He cannot hear the directions given in the school-room, the oral recitations of his classmates, or the questions put to him. The frequent reprimands of the teacher are discouraging and oft-times produce a sensitiveness and fear which may wreck the entire nervous constitution of the little unfortunate; he becomes indifferent to his work; he sees his classmates promoted and loses ambition; his school life, which the healthy child always looks back upon as one of the most pleasant reminiscences of his life, becomes to him irksome and a source of constant regret, and he often discontinues his scholastic work long before he has acquired an education sufficient to fit him for his strenuous labors as a useful citizen. This is not a pen-picture, but a brief, unvarnished description of a child with defective speech or hearing, selected at random from the twenty to thirty per cent of our entire enrollment of school children in the United States. We must recognize, then, the importance of systematic examination of all school children, in order that more definite attention may be given to such defects as they are singled out.

The practical application of medical and pedagogical science in its relation to the deaf child is of varying possibilities. The deaf child must be classified according to the degree of deafness which exists. The results of special training and the development of these several classes of defectives depends for its efficiency on

the character of such teaching and the success with which it can be applied.

Classification of the Degrees of Deafness: 1. Total deafness, before speech has been acquired. 2. Total deafness, after speech has been acquired. 3. Pronounced deafness. 4. Slight deafness.

Total deafness before speech has been acquired comprises that class of unfortunates who are congenitally deaf, or who have acquired deafness in early infancy and before they have been taught to speak. These weaklings are not only deaf, but also dumb, and form that large group of children whose education is acquired under tremendous difficulties and hardships; for we deal here with pupils whose voice and speech-producing organs are practically undeveloped. With all the progress which has been made in practical and pedagogical science, the de l'Epée system of sign language and the manual or finger-alphabet is still frequently employed in the training of this class of children, especially in France and England.

In the sub-class of total deafness after speech has been acquired, some of the teaching difficulties are eliminated. In this class the child has acquired speech to a greater or less extent, depending on the age of the child before deafness has developed. One of the serious difficulties therefore, namely, the teaching of the production of speech, is here eliminated. It is in the disposal of this class of children that grievous errors are frequently committed. Viewing this question not as a teacher of the deaf, but from an experience and association of twenty years with such defectives, from the standpoint of the otologist, it is my humble opinion that this group of pupils should under no circumstances be taught by the sign-language or the manual alphabet. They have acquired speech, a wonderful asset in their future social intercourse, and this should be cultivated and not stunted. All sign language should be eliminated from their teaching and lip-reading developed as the rational system of instruction possible and practical in this class. I refer to this deliberately and emphatically, for many of the schools for the deaf, both public and private, state and municipal, still employ the sign language indiscriminately in the teaching of children classified as totally deaf without the acquisition of speech, and those totally deaf after acquiring speech.

There has been an interesting evolution in the teaching of this class of the deaf in America. I quote from the interesting statistics gathered by Wright[3] as to the progress of the oral method and

the decline of the manual method. "The first school in the United States where pupils were taught exclusively by means of speech and writing without signs or the manual alphabet, was established in America in 1867. Twenty-six years later, in 1893, twenty per cent of the 8,000 pupils in the schools for the deaf in the United States were taught by the purely oral method. In 1908, fifteen years later, there were 12,000 pupils in school and 56.5 per cent were taught without the use of signs or the manual alphabet. At the same rate of progress another generation should see the practical disappearance of manual methods from the school-room."

This method of instruction has been a bone of contention among teachers of the deaf for a long period, and it is time that a unification of opinions on this question, of such vital interest to the future of the individual pupil, should be adopted.

Pronounced deafness is applied to those who possess sufficient function of hearing to distinguish the sounds of the human voice whereby they may be trained by the auricular method to differentiate vowels, consonants, or even some words classified by the British Royal Commission on the Deaf[4] as the semi-deaf. A more accurate means of determining the limitations of hearing has been definitely developed in the achievements of Bezold by means of the continuous tone series of tuning-forks. Children who cannot appreciate the sounds of the tuning-fork within the tone limit of the musical scale from b' to g'' have been found incapable of sufficient perception of speech to warrant their successful training by means of the auricular method. This is known as the "word-limit" of the musical scale, as tested by the tuning-fork series. When this relatively small portion of the sound scale is present and the other functions of the child are found to be normally developed, it is reasonable to assume that this child can be taught to speak in the natural way by the auricular hearing method. It is not within the scope of this paper to consider the details of advanced methods in the teaching of the deaf, but I cannot refrain from an honorable mention of our colleagues in otology who have been largely instrumental in this new impetus for the training of the deaf. To V. Urbantschitsch, of Vienna, we must credit the first successful results in the instruction of the deaf by a systematic course of training by the aid of the voice. It was my privilege to be present and to participate in the demonstration of the first results of this system of aural practice in 1893. The first successful results obtained by this system among our American institutions were embodied in my paper[5] presented before the American Academy of

Ophthalmology and Otology with demonstration of a class of sixteen deaf children showing the marked improvements obtained by this method. Hartmann[6] has devoted much time and attention to the oral and aural methods of instruction of the deaf. He decries the use of the finger alphabet in all cases and presented at the International Otological Congress in Budapest, a very impressive statement of successful results obtained by the oral method throughout Germany. Wanner[7], of the Bezold school, recently gave a convincing demonstration of the value of segregating cases by tuning-fork tests and then successfully teaching them by the auricular method. Here in America many of our progressive teachers of the deaf have taken up this advanced method of training, and the results and influence of the good work already obtained is attracting attention and recognition in every section of the land.

To our esteemed colleague, James Kerr Love, of Glasgow, belongs the credit of bringing the medical profession in close relations with the teacher and with the institutions for the deaf; of presenting a valuable comparative study of the teaching methods employed and a classification of the deaf in institutions at home and abroad.

I have included in the fourth class of *slight deafness* a large number of children referred to so frequently in the reports of the systematic examination of school children as having nasal obstruction, adenoid growths, hypertrophied tonsils, suppurating ears, or other mechanical or pathological conditions producing a moderate degree of impairment of hearing. These children are not sufficiently handicapped to require training in special schools or by special methods, but they should be assigned to smaller classes where better individual instruction may be given and where these defects may be constantly before the mind of the teacher, so that all allowances for insufficient scholastic work may be made and more careful supervision directed.

In all of these forms of deafness the physician should share with the teacher and the parent the responsibilities for the proper training and attention to this class of defective children. The education of the deaf is not a charity but just as sacred a civic obligation as the education of the normal child, and the physician, especially the otologist, is an influential factor in its proper upbuilding.

Another force which must be developed in this splendid cause is the education of the undergraduate in medicine. Those of us who are teachers in the medical department of our universities present

to our classes in otology every phase of otological science from detailed anatomy to the most intimate ramifications of the labyrinth and touch on many unusual diseases and complicated operations, but how many medical teachers devote any part of the session's work to a discussion of the deaf child as he may be found in the country communities as well as in the cities, the determination of the degree of deafness in each case, the proper advice to the parents for the educational institution best adapted to the child of such infirmities? I would go one step further without fear of contradiction and say that there are many otologists to-day, authorities in their field of work and prominent as medical teachers, who are themselves uninformed concerning the public and private institutions for the deaf in their own state or their own community. Here is where the reform and crusade must begin. If we are to benefit the general practitioner, the teacher and the parent, it is incumbent on us as specialists in medicine who are brought in touch with these important problems to acquaint ourselves with all of their details, recent research and future possibilities for good.

III. PERSONAL EQUATION.

The influence of the physician in the family must be regarded as of vital interest to the welfare of the child and his advice is often given along broader lines than simply for its physical care and mental development. It is the physician who first comes in contact and intelligently recognizes the child's defects and its future depends largely on the character of advice which the physician offers the family as to its proper disposition. There are some popular fallacies still prevalent, especially in the rural districts, and it is even surprising to hear well-informed men and women of our metropolitan communities refer to the deaf-and-dumb and the deaf-mute in so definite a way as to indicate that the impression is firmly fixed in their minds that deafness of this form must absolutely be associated with absence of voice or speech. Again, the fear of an "operation" is often so intense in the mind of a nervous mother that she will delay for years having her child's adenoids removed or tonsils excised because the doctor, under pressure, has offered the questionable alternative that "the child may outgrow this condition and the adenoids or tonsils may be absorbed when it has reached the age of puberty." Viewed in the light of the pathology and surgery of oto-laryngology of to-day, such fallacies and such delays are almost criminal. It is here that the physician must act, not only as the adviser but as the educator of the family, so that

every measure for prophylaxis and for the child's physical growth and mental development may be properly employed.

It is our duty to co-operate just as faithfully with the teacher and the parent in the education of the deaf child, as it is with the normal child. I might even insist that our obligation toward the defectives are greater, for our means for their proper care and education are less perfectly and systematically developed, and it is only by intelligent co-operation, diligent examination into every cause and condition associated with these defects, and with scientific and pedagogic evolution and progress, that we hope eventually to bring about a higher standard of efficiency in this important educational field.

It may not be as fascinating to the otologist to contribute his energies, his logic and his talents to the development of this question which so vitally affects the welfare of the community and of all human kind, as to concentrate his time on original research or on the intricate pathology or operations on the labyrinth, but we are confronted with the appalling information that four million defective school children exist in the United States alone and this obligation must be met by the profession, and a large share of it must be assumed by our American otologists.

BIBLIOGRAPHY.

1. HOLLOPETER: The Duty of the Physician to the School-Child, *Jour. A. M. A.*, Oct. 19, 1907.
2. ALLPORT: The Necessity for the Systematic Examination of School Childrens' Eyes, Ears, Noses, and Throats, *Med. and Surgical Monitor*, February, 1904.
3. WRIGHT: The Deaf Child and the Physician, *Jour. A. M. A.*, Dec. 25, 1909.
4. LOVE: The Study of the Deaf Child, *Glasgow Med. Jour.*, January, 1907.
5. GOLDSTEIN: Advanced Method in Teaching the Deaf, THE LARYNGOSCOPE, June, 1897.
6. HARTMANN: Deaf-mutism, Monograph published in 1881.
7. WANNER: Demonstration, International Otological Congress, Budapest, September, 1909.

3858 Westminster Place.

DEVELOPMENT OF THE HEARING.*

BY MRS. J. SCOTT ANDERSON, SWARTHMORE, PA.

1. How the Normal Child's Hearing Develops From Early Infancy: The normal baby learns to understand the language spoken around him only after he has long been familiar with such sounds as the rustling of his crib sheets, the opening and closing of the door, the splash of water, the mother's lullaby, and the soft footfalls of those who are his care-takers. These voices of the home, added to those of the outer world increase his knowledge of his environment and develop his hearing, while the constant repetition of spoken language, associated with certain acts and situations, soon enables him to comprehend the meaning of the sentences he has heard and later to use them.

2. Relation of Hearing to Vocabulary, Speech, and General Understanding of Spoken Language: While the senses of sight and of touch are a great aid to the child learning to talk, that of hearing plays a double rôle. It enables him first to understand and then to reproduce. He hears the speech of others and attempts to talk. He hears his own voice and modulates it accordingly. His language is a reproduction of what he hears, and will be modified as time goes on by what he reads. If he does not hear English he will not speak English. Just as you, not hearing Chinese spoken, are unable to converse in that tongue. Thus we see what an important factor hearing is in the development of language.

3. Contrast Between Natural Development of Hearing and Usual Methods Employed With the So-Called Deaf: Thus the hearing child becomes accustomed to sound and speech long before he attempts to talk. We leave him alone to work out his own salvation, but what do we do with the deaf pupil? We speak into his ear for fifteen minutes daily, allowing him to remain in silence for the remainder of his waking day. We say, and truly, that he can stand only a short period of ear work, because it is too nerve-racking. Nevertheless we expect him to learn to hear some words and sentences in just those few minutes. Wonderful to relate, he does, once in a great while, come up to our expectations,

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910

but at enormous cost of effort on both his side and that of the teacher. Why do we persist in a method so different from that of nature?

4. Proper Use of Artificial Aids: Artificial aids, which magnify sound, should be constantly used if they enable the child to hear better, for they not only make the pupil conscious of sound while they are being used, but increase the general ability to hear at all times. Let the child wear one on the left ear if possible, in school and out—even at table. Let him become used to the sound of the voices of his schoolmates; the pleasant or sometimes angry voice of his teacher, the tapping of little feet upon the floor, the slamming of the door, laughter, music, and street noises. Let him, like the normal child, simply hear and hear and hear, no matter what he hears. Then when the time for daily drill arrives, there is no difficulty in securing attention—and there is less nervous strain because the child is accustomed to sound. This is the logical method of developing the hearing, as it requires almost no effort on the teacher's part, and is a source of real pleasure to the child.

5. Auricular Drills: In dealing with our pupils we have two classes to consider, those whose hearing is only defective, and those who are practically deaf. In either case use an instrument in school and out—at all times when it does not interfere with the child's play. Never allow a drill to exceed fifteen minutes with older pupils, and spend even less time with the very little ones, else they will become nervous and tired.

First Class: With the partially deaf the aim is to increase distance at which sounds already heard may be distinguished and to add new words to this list. Test the hearing by conversing with pupil, using whatever tone is best heard. Then seat pupil with back toward teacher and determine how far away familiar questions, quotations, sentences and words may be heard, making that limit your starting point. Begin the drill by asking for every-day information or by discussing topics of general or special interest. Next, use names of the days of the week, letters of the alphabet, and numerals, always guarding against telling pupil when he does not hear correctly. Keep a careful record of sounds heard, as well as of those not heard. There is, of course, a limit beyond which sounds cannot be heard, but the first halting place is seldom the last.

The practical results of this drill are: 1. Pupil hears at increased distance from speaker; 2. He hears a greater number of words, sentences, etc.; 3. He hears new sounds on which he has never been

drilled. However, a peculiar thing is here noticeable. Conversation carried on in tones different from those used in the drill can seldom be heard, but if a second drill be resorted to, all tones between the two drills may be heard.

Second Class: As the so-called deaf child never learns to hear many words or sentences, we should not make the understanding of these words our aim. It is too high. Neither should we cease our efforts to teach him to hear, as most teachers are likely to do. What should our aim be? To train the child so that, through hearing and touch he is able to reproduce the tones of his teacher's voice and to accent words and sentences correctly. We can do no more. This should be accomplished by first calling his attention to the existence of sound itself and to number of beats. Then he should be taught to distinguish between the sound of different bells, musical instruments, and finally the various tones of the human voice.

6. Why the Deaf Child Should be Taught to Hear as Well as to Speak.—In closing I would say that I have left an exceedingly strong reason for auricular training until the last. While little, if anything, is known concerning the physiology of the brains of the deaf, contrasted with those of the hearing, psychologists assure us that where one center is inactive the whole structure suffers. What then must be the result of the inactivity of two centers, that of speech and that of hearing? Reasoning from the accepted theory we find that such a condition should tend to abnormal (or should I say sub-normal?) brain development. Does it? Have we proofs either way? Are orally taught deaf children really more nearly normal than those taught otherwise? Is this the reason they appear so much brighter? I believe so, and I believe that we find here a most convincing argument for the oral method of instruction, even though the speech of many may be very defective.

Considering that there is a probability, of better general brain development when all the centers are called into activity, the duty of the instructor of the deaf is surely very plain—to develop both speech and hearing in every child in the classroom.

THE MENTAL DEVELOPMENT OF THE DEAF CHILD.*

BY EDWARD M. GALLAUDET, PH. D., L.L. D., WASHINGTON, D. C.

The condition of the mind of an uneducated deaf child which differs from that of the normal child, may be described by the single word deaf-mutism. The phenomena of deaf-mutism arrange themselves in two distinct divisions, namely, the physical and the psychical. Physical deaf-mutism will be readily understood as consisting in mere organic deafness, and consequent dumbness, while psychical deaf-mutism includes the mental and moral conditions induced by and growing out of the physical disability.

It may be said of deaf-mutes as a class that their physical deaf-mutism cannot be entirely removed. Their deafness has hitherto baffled the relieving hands of the surgeon and the physician. Their dumbness has only partially yielded before the persistent efforts of teachers of speech, to whose patience and skill all praise is due. The record of more than a century's labor in Christendom shows clearly that speech can be perfectly acquired by no more than a proportion of actual deaf-mutes. It is, therefore, upon psychical deaf-mutism that the attention of the teacher should be chiefly fixed, to the complete removal of which, in a vast majority of cases, no inherent or insurmountable obstacles present themselves.

Psychical deaf-mutism may be considered under three sub-divisions, viz., 1, mental; 2, moral, and 3, social. In the mental development of the deaf-mute, the great and peculiar obstacle is his lack of language. That marvelous process by means of which the hearing child, between his first and four year, possesses himself, without conscious effort of his mother-tongue, has no counterpart in the experience of the uneducated deaf child; and as a consequence he lacks not only the language, but all that mental discipline and growth, which are incident even to the vernacular acquirement of language.

That the untaught deaf-mute has methods of thought is undoubtedly true. But the necessary crudeness of them will appear from the reflection that as he works them out, he can only imperfectly call to his aid the imitative faculty. He must originate al-

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

most everything, and arrive at just conclusions only after blunders indefinitely more numerous than those of the hearing child.

Even in the imperfect development possible to the uneducated deaf-mute, the necessity of *some* language becomes apparent. Failing to learn that of his fellows, he will invent one of his own, and impose its use on all who will accept it. And when the indifference, or hard-heartedness of his family or associates denies him the use of this, he lapses into a condition but slightly elevated above idiocy.

In proof of this an instance may be cited which fell under the speaker's notice some years ago, of a girl who had been held as a household drudge or slave by her family, till in her sixteenth year she was brought, through the interference of her humane neighbors, to a school where she might be taught. On entering she presented evidences of idiocy that were thought to be unmistakable. Premature decrepitude of form, with crooked, claw-shaped fingers, and a face utterly expressionless, were taken as plain tokens of mental feebleness.

A few months, however, of the ordinary treatment of a school for the deaf, wrought what seemed almost a miracle. Rest from exhausting labor allowed the fingers to relax and the form to straighten; kindness lighted smiles in a face that had lost, if it had ever possessed the power of changing its expression; patient instruction reached at length the awakened intellect, and at the end of a year eager happy intelligence was in process of healthy development, where there seemed before to have been no germ of mental life.

The language of pantomime suffices for the ordinary development of the intellectual faculties. A deaf-mute who never learns a language of words, may still be taught much as to the operations of the natural world, something of history and geography, not a little of science and mathematics, the laws and usages of society, and the principles and precepts of religion. But this will not relieve him of his mental deaf-mutism. Having no language in common with his fellow-men; shut out from the stores of information and food for thought conserved in books; unable to acquaint himself with even the news of the day as chronicled in the journals; often excited and perhaps tormented with thoughts and queries for which he has no means of exact expression, his mind may be likened to an eagle caged or a lion chained. He will either lapse into the contentedness of ignoble bondage, or drag

out an unhappy existence, beating at bars, or chafing in fetters from the thraldom of which he is powerless to free himself.

The question naturally rises in the mind of a philanthropic person: "Is there no way of escape from so sad a condition?" Happily an affirmative answer may be found in the history of every well-ordered school for the deaf. Among those taught many will appear, who, remaining physically deaf, are no longer dumb, or in the condition of mental deaf-mutism.

Their processes of thought, their methods of reasoning, their modes of expression, are the same as those of hearing persons, with the exception that verbal language is to them *only* visible, whether coming to them from the lips or hands of others, or from the printed page, and not visible or audible according to circumstances.

Another exception should also be made, that a person born and continuing totally deaf can have no appreciation of the phenomena of sound.

But this is not true of that rather large proportion of the deaf who have had hearing for several years. To them the mental condition of deaf-mutism does not in any degree appertain, and the extent to which they can appreciate the phenomena of sound has been aptly described by one of their own number in a sonnet.

> "They are like one who shuts his eyes to dream
> Of some bright vista in his fading past;
> And suddenly the faces that were lost
> In long forgetfulness before him seem—
> Th' uplifted brow, the love-lit eyes whose beam
> Could ever o'er his soul a radiance cast,
> Numberless charms that long ago have askst
> The homage of his fresh young life's esteem;
> For sometimes, from the silence that they bear,
> Well up the tones that erst formed half their joys—
> A strain of music floats to the dull ear,
> Or low melodious murmur of a voice,
> Till all the chords of harmony vibrant are
> With consciousness of deeply slumb'ring powers."

We pass now to the consideration of the second feature of psychical deaf-mutism, namely, that which pertains to the development of the moral nature. The untaught deaf-mute is either wholly devoid of language, or possesses it in a very imperfect de-

gree. In the first case, if he continue without language, his moral development is an impossibility. In the latter case the readiness with which his moral perceptions may be awakened, and his moral powers trained increases with the growth of his faculty of language. That an uneducated deaf-mute should be morbid, suspicious, jealous, selfish, unreliable and dependent, will seem most natural when one considers at how terrible a disadvantage he remains, as compared with his hearing fellows; and to how small an extent his mind has been affected by those influences, which naturally eliminate these undesirable moral qualities from the human character.

It must be observed that we have not claimed the possession of verbal language as necessary to the moral development of the deaf-mute. His natural language of signs will suffice for this; that is to say for imparting the essentials of a moral character. The speaker is, however, of the opinion that, other things being equal, the deaf person who has a perfect command of verbal language, has a decided advantage even in points of moral development, over one whose habit is to think in signs.

That moral deaf-mutism can be entirely removed by the methods now employed in our best schools, admits of no question. That is to say, that the standard of moral character among the graduates of our schools for the deaf will be found to be quite as high as that of persons with all their faculties, who have had an equal amount of education.

In providing means for the moral and religious training of deaf children in schools, practice differs as to the employment of the sign-language. In the opinion of the speaker the use of this language in addressing considerable numbers of deaf persons, whether children or adults, is of great value. In this view he is sustained by two of the leading schools in Germany, both of which are oral schools, and one of which is the cradle of the oral method.

When we consider social deaf-mutism it goes without saying that the deaf-mute, denied all language must remain a social cipher. Given only the sign-language, his enjoyment of social privileges is of course limited to the narrow circle of those who can use that language. If we add verbal language, even without speech or the power of lip-reading, we widen the social range very greatly. And those deaf-mutes who are so fortunate as to possess the power, and are granted the opportunity of acquiring these last-named accomplishments to a degree reasonably approaching perfection,

may, without doubt, aspire to complete enfranchisement from social deaf-mutism. Whether conditions between the hearing and the deaf are such as to enable the latter in large numbers to realize this aspiration is a question.

It is an oft-repeated assertion that when a deaf person has acquired the power of speech, and is able to read the lips of others he is "restored to society." In a recent letter a deaf lady of high social standing and unusual mental ability, who was educated in an oral school, writes as follows:

"It seems to me the pure oral teachers expect too much of both the deaf and the hearing. They think that the former should be capable of an equality with the latter, which is physically impossible. They think the hearing should receive the deaf with open arms, or at least meet them half way. They ought to, of course, but the practical question is, do they? In most cases, no. Where there are deaf friends or relatives, something of interest and kindness will be shown by the hearing, but with ordinary people the deaf are simply strange creatures, like the idiotic or insane, though of course in a less degree. The great majority of oralists are absolutely ignorant of the way they are laughed at behind their backs. I myself knew nothing of this while I had home and family to ensure me respect, but I have had some bitter experiences since then.

"For this reason, if for no other, those with bad voices should *not* be forced to talk. They simply make themselves a laughing-stock among the hearing. I have been told that my voice was not specially disagreeable, yet I have known hearing friends to pass me on the street without recognition, and when I demanded an explanation confess that they did not wish the friends they happened to be with, to hear me speak. Is not that enough to seal the lips of any sensitive oralist?

"In all this I am putting myself in strong antagonism to my school, but it is not to be helped. Truth and common sense should be considered as well as theory, and with the theories of the pure oralists I cannot agree."

In many of our large cities and towns associations of the deaf exist. The meetings of these societies are for social enjoyment, with lectures in the sign-language on subjects of interest, and for religious worship. These associations are condemned by some as tending to isolate the deaf from the hearing, thus making their social deaf-mutism permanent. We cannot join in this con-

demnation, though our advice to the deaf has always been to mingle with the hearing as much as possible, and not to depend for all their social enjoyment on intercourse with each other. It is natural for the deaf to come together socially, and they should not be denied that pleasure. But especially should they be sustained when they seek to have religious instruction and worship in that language in which, alone, such instruction can be given, and such worship can be conducted, in a manner to be understood by a considerable number of persons.

The lady from whose letter a quotation was given a few minutes ago writes as follows on this matter:

"I insist on signs and signs only in public speaking to the deaf. On March 20, 1910, I was present at the confirmation service at Trinity Church, Boston, where Mr. Smearing interpreted to us the sermon of Bishop Lawrence. When I came to read the printed report of that sermon I found nothing new. Had I been seated with the general audience I should not have known a word from beginning to end."

Society may offer to the individual deaf-mute social recognition, and many testimonials of thoughtful consideration which he has no right to demand. In any neighborhood where an educated deaf-mute may have taken up his residence, the work of relieving him of his social deaf-mutism should go on. A little patience and painstaking to establish easy communication; a litle exercise of self-denial; the acceptance of the deaf-mute neighbor as a *fellow man*, and not always as a deaf-mute, will in process of time perfect the work begun by his teachers in school, emancipating him so fully from the trammels of mental and moral deaf-mutism, as to make him often forget the burden of the heavy trial which must still rest upon him, when all shall have been done that the good-will of his fellow-men can devise and suggest.

Gallaudet College.

THE DEVELOPMENT OF SPEECH IN THE DEAF CHILD.*

BY A. L. E. CROUTER, LL. D., PHILADELPHIA.

An eminent neurologist, Dr. H. H. Donaldson, has tersely defined education as the modification of the central nervous system. "The education of an individual," he adds, "is a very local problem in its details." The teacher of the deaf is quite free from any doubt as to the precise localities in the brain of his pupil, which need attention. His problem is not how to facilitate the development of a normal organ, but how to repair the injuries of a crippled structure. I need hardly point out the fact that the tragedy of deafness lies not in the mere fact that the deaf child does not hear sounds, nor that he does not speak, but in the almost irremediable effect which it produces upon the development of his mind.

Before discussing "the Development of Speech in the Deaf Child" and attempting to answer the questions *where* and *when* and *how* he should be taught to speak, let us consider carefully his mental condition and the question *why* he should be taught speech at all. The normal child has three principal store-houses of language. In the first temporal convolution in the auditory area of the brain are stored words received through the ear; in the angular gyrus of the visual area are stored words received through the eye in reading; while in the motor area, in Broca's convolution, is stored every word which can be spoken. These three centers connected by the nerves of association which alone render them operative, constitute the mechanism of speech within the brain.

The born deaf child comes to us without a single impression in any one of these centers. A war of centuries has been waged among his teachers over the question of the advisability of attempting to establish the missing function of speech. It would certainly be easier for all concerned to leave him a few thousand years behind the race, in the use of that language of signs from which human speech has been evolved, a stage of development beyond which he is unable, in the very nature of the case, to advance without assistance than to attempt by long years of patient labor to develop these centers of functional activity did not humanity and the child's best welfare demand the effort.

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

Under the old psychology which assumed that the brain functioned as a whole and therefore that it could be developed as a whole, as the body may be developed by gymnastics—signs were logically believed to have great disciplinary value. Language was taught by translation through signs and remained a secondary form of expression. If, however, the natural method is superior to translation in teaching a foreign language to a hearing child, it is surely unwise to teach English to a deaf child by translation through a language which not only has a different order and idiom, but is not a language of words at all, but a language of pictures presented in pantomime. Dr. W. H. Thomson, in discussing the faculty of speech, says that "Thoughts need words to become true thoughts, but feelings do not need words to become true feelings." The deaf-mute, habituated to the use of signs, is condemned to a life of feeling upon a mental plane far below that of a mind disciplined by the use of words.

But more recent investigations into the workings of the brain and the establishment of the facts concerning the localization of its functions have necessitated a revolution in methods of education. We know now that the development of intelligence results from modifications upon the frame-work of fundamental functions in the central nervous system produced by perfecting the sense organs and by establishing paths of association between them. We know that brain power depends chiefly upon the complexity of these associations. We know also that lack of development in one part of the brain measurably weakens the whole structure. Our effort then should be to establish in the brain of the deaf child the greatest possible number of functions and of associative reactions between them. Even if the articulation and lip-reading of deaf children prove of no practical value as a means of communication, their acquisition has been of incalculable value in mind-building. Baldwin says of the development of language that "the way of getting to speak by imitation is itself perhaps the profoundest pedagogical influence in the child's mental history. * * * It is because the parent or teacher has more lessons for him to learn * * * that it is important for him to learn the present words. They cannot impart their learning except in the molds in which they have learned."

How, now, does the process of developing speech in the mind of the deaf child differ from the procedure in the case of the normal child? The auditory area cannot be reached and therefore no language center can be established there, but the visual area may be made to do double duty, by establishing in it not only a registry

of written and printed words, but also—a faculty which the normal mind does not ordinarily possess—a registry for spoken words. Just as the blind establish a third word registry by which they read through touch, so the deaf may acquire a record of lip-read language from which the motor speech center undoubtedly receives its strongest stimuli. To a lesser extent they store away impressions of speech received through touch, since it is upon that sense that they must rely for the modulation of vibration and force in articulation. These phenomena afford us striking examples of the wonderful power of the brain to create new functions under the constant repetition of a stimulus.

We have been considering the case of the child born with no hearing at all. The teacher of the deaf, however, is not confronted with this type of child alone. Fully 25 per cent of the pupils in our schools possess some degree of hearing—for it devolves upon the school for the deaf to afford instruction to all children who have not hearing enough to acquire language naturally.

Children who have enough hearing to develop the motor center through auditory stimuli should not be placed in schools for the deaf. Their development will be more rapid and more nearly normal if they are compelled to rely upon auditory impressions. Such children are, however, often neglected until too late for their best development through the ear, and sight and touch must then be called into service to gain speech impressions with which to re-inforce those received through hearing. A slight degree of deafness which would not greatly inconvenience an adult, seriously hampers the development of the growing brain of the child, interfering, as it does, with the frequency of the stimulations upon which the development of the nerves of association absolutely depend and without which the mechanism of speech, however perfect, must remain inoperative.

It is to this lack of sufficient stimulation that we must attribute the disappointing results of the use of various mechanical aids to hearing with this class of pupils. Experiment quickly demonstrates that many of these appliances do, in some degree, aid hearing and the hasty conclusion is drawn that by their use the deaf child may become a hearing child. The trumpet or other device, can only be used by the child during a fraction of his waking hours, but his eyes are always on duty ready to store the visual language center with impressions which are to bear fruit in speech. Lip-reading, rather than ear-training, remains then, even for the partially deaf, the surest reliance for the speech teacher. The partially deaf child

may be able to store his auditory center with speech impressions by the use of some mechanical appliance, but very considerable hearing power is needed, in such cases, to give sufficient stimulation to force the development of the necessary lines of communication between the auditory and motor centers, which alone can make his auditory impressions of service in the production of speech. Let me repeat the opinion that children who possess such hearing powers should never be associated with deaf-mutes.

In this connection it may be of interest to note the cases of certain hearing mutes, who, entering school with normal hearing, but without speech, have developed the power through lip-reading. These pupils have undoubtedly lacked proper communication between their auditory and motor centers, from whatever cause, but upon the establishment of a visual speech center the dormant motor area has awakened and become operative. In other cases having the same external characteristics where the motor area fails to respond to visual stimuli, we must conclude that the defect is in the Broca convolution itself and, therefore, that speech is impossible under any stimulation.

It must not be supposed from what I have said concerning the value of partial hearing in producing motor reactions that the hearing powers in such cases are of no use. A degree of hearing quite insufficient for the development of an auditory speech center is still invaluable to the teacher of articulation in the cultivation of voice. The teacher must laboriously train the totally deaf child to distinguish differences of vibration by touch, which even a slight trace of hearing would enable him to differentiate without difficulty. So keen, indeed, is the expert articulation teacher in the detection of these traces of hearing that she often develops valuable hearing powers in children who have not responded at all to the tests of the aurist. This happens most frequently in cases where the child can hear only a tone of a certain pitch or quality, which is discovered only after long experiment. These slight hearing powers are also of prime importance in teaching accent, emphasis and inflection. What Sidney Lanier has so aptly called "speech tunes" the totally deaf child can never acquire, and his teacher finds to her sorrow that intelligibility depends more upon these speech tunes than upon exact consonant positions or upon the production of pleasing tones of voice.

The teaching of lip-reading to the deaf child should begin in infancy. It is of fundamental importance that his visual store-house of words should begin to receive images at the earliest possible mo-

ment, since it is upon this store of word memories that we must depend later for motor stimuli. It is at this point that superficial students of the subject are likely, and indeed often have, fallen into grievous error. It does not at all follow that because a totally deaf infant may wisely be taught to read the lips he should be allowed to attempt to articulate at the same early age. A hearing child often talks baby-talk which only his nurse can understand, but he has no difficulty, as his ability to differentiate sounds increases, in correcting his errors in pronunciation. Little by little he becomes conscious of his defects and one by one he corrects them. In the case of the totally deaf child the very opposite is true from equally natural causes. The hearing child rouses his motor speech center through his auditory and motor memories. The deaf child gets comparatively little aid in articulation from visual images obtained from lip-reading, for, much as this power aids him in acquiring language, it is entirely inadequate to the production of correct articulation, since only a few of the positions taken by the vocal organs in pronouncing, even the simplest words, are visible. He must depend almost entirely upon his kinesthetic word center—recalling words always in terms of sensations of movement. A sound mispronounced at first may be doomed by the law of habit to be forever mispronounced. I do not need to dwell upon this point before this audience. Anyone familiar, as you are, with the difficulties of overcoming wrong habits in cases of stammering, asthma and the like, will recognize the analogy, and understand the great danger there is in attempting to teach a deaf child to articulate before he is old enough to take exact positions easily and perform, as he must perform, highly-complicated exercises in vocal gymnastics. No one would attempt, I think, to teach a child of two or three years to play the piano, but the production of spoken words by a deaf child is a far more difficult and complex achievement. Burk tells us that the kinesthetic sense, necessary to the production of the definite voluntary movements of articulation is, in general, in a very immature state until eight or ten years. This, in the case of the hearing child. The wise teacher therefore delays work upon articulation until her pupil is sufficiently mature to stand the mental strain. Individuals differ greatly, of course, some children taught as early as five years giving good results, though the age of six is considered safer with the average deaf child, and many experienced articulation teachers maintain that they have secured their best results with children of eight. These are points which only careful experiment covering a long period of time have been able to determine.

Careful observation of the school history of the deaf child confirms me in these views. The articulation of the hearing child tends to improve without special effort on his part or that of his teacher—simply through the aid of his hearing. The articulation of the deaf child, on the contrary, tends to deteriorate, and throughout his whole school course he requires daily drill and correction in order to maintain his speech powers. It is a well-known fact that a deaf child's articulation is at its best during his first years in school. As his vocabulary increases and his speech grows more complex, he tends to become inaccurate and careless in articulating. When he leaves school and finds himself among people who do not readily understand his imperfect speech, we note a marked improvement owing to his greater effort to make himself understood.

At this point let me pause to define certain terms I am using which are often employed loosely in discussing these subjects and do not make for a clear understanding of them. Let us remember that speech =articulation+language. A deaf child of six or eight will, in the first three or four months of his school life, acquire accurate articulation, but he still has no speech. This articulation is simply an instrument to be used with lip-reading in the long years of work required to give a deaf mind an understanding of language. Beside that task, the work of the articulation teacher becomes insignificant and simple.

From the subject assigned to the gentleman who is to follow me, I conclude that I am expected to speak more particularly about the development of articulation as a factor in the speech of the deaf-mute, but, before entering upon that phase of my subject, I want to mention two points upon which there is much popular misunderstanding regarding the oral method. The first is the question of aim or object. The oral teacher does not use the oral method for the development of speech per se, but because he is convinced that by its use he secures a better command of language and greater mental development. The second point is an historical one. There seems to be a popular delusion that the oral method is a new thing, and I have even heard the faulty articulation of the deaf explained on the ground that the method was a new one which would doubtless produce better results when experience had perfected it. The truth is —I might almost say, the sad truth is—that the oral method is the oldest of all methods of teaching the deaf, and has been far more widely used than any other. Quite by chance the first teacher of the deaf imported into this country, nearly a century ago, was a French gentleman, who brought with him the French Sign Method. Half

a century later, Laurent Clerc, one of Sicard's famous pupils, through the efforts of Gardner Green Hubbard, Horace Mann and Samuel Gridley Howe, the German method was introduced in Massachusetts. This method had been slowly perfected by long years of that painstaking work for which German teachers are so justly famous. Nor was its application to the problem of teaching English undertaken in a haphazard way.

Alexander Melville Bell, who, by his Organic Method of classifying sounds and his Visible Speech Symbols, had placed the study of phonics upon a scientific basis in England, had already devoted some attention to the work of teaching articulation to the deaf. He was at that time lecturing at the Lowell Institute and was appealed to for assistance by those interested in the introduction of the German method. His son, Alexander Graham Bell, whose fame as the inventor of the telephone, has somewhat overshadowed his achievements as a phoenetician, came to the assistance of these workers, and for several years devoted his expert knowledge of the subject and his remarkable powers as a teacher to the task of giving articulation to the deaf. He gave lessons to teachers and pupils in several schools and established in Boston a training class for students. His two most distinguished pupils are still at the head of the two pioneer oral schools established at that time in Massachusetts—Miss Sarah Fuller, principal of the Horace Mann Day School for the Deaf in Boston, and Miss Caroline A. Yale at the head of the Clarke School —a boarding school at Northampton.

The American Association to Promote the Teaching of Speech to the Deaf—founded by Dr. Bell, and endowed by him as a memorial to his distinguished father—maintains in the Clarke School a normal class which is sending out every year highly-trained articulation teachers who are carrying on in schools for the deaf all over America, the careful scientific work begun forty years ago by this great philanthropist and inventor. Let us now consider the methods of speech teaching which have been evolved by these expert teachers and their reasons for adopting them.

Hartwell, in speaking of the training of the speech function, says: "It seems to me that we may safely aver that the law of the evolution of the nervous system is of great pedagogical importance, since it suggests the natural order which should be followed in training the organs concerned in any complex co-ordinated movements. For instance, it is transgressing the laws of nature to emphasize the training of the fingers before the neuro-muscular mechanisms of

the hand, arm and shoulder have become thoroughly organized, and their respective movements brought under control; or to attempt to teach a child to read aloud before he has learned to speak plainly and readily." It is of prime importance then that before the deaf child attempts to use language he should develop his speech powers by following as nearly as possible the natural order of development of the function in hearing children.

An infant only a few months old amuses himself by repeating over and over some consonant sound—it may be vocal or non-vocal—and is quite as likely to give the consonant alone as in combination with a vowel. A careful observation of a number of infants forces me to the conclusion that the order in which such sounds are made is entirely accidental. One infant's first attempt at speech—if we leave out of account the vowels uttered in crying—is ma-ma-ma, while another begins with t-t-t-t- and another with g-g-g and so on. For several months the infant continues this articulation drill in the use of syllables and elementary sounds, the combinations growing gradually more rapid and more complex until at about the time words begin to take on meaning, we often hear the child "jabbering" for some minutes almost continuously, using a variety of complex combinations. With the deaf child, the teacher follows practically the same order of development, modifying it only as she is compelled to do so by the fact of his deafness.

Miss Yale, of the Clarke School, in her valuable treatise on the Formation and Development of the Elementary English Sounds, says: "It would no doubt be possible to teach the elementary sounds in the order of their natural arrangement in groups and scales, but it is vastly easier for a little deaf child, if he is aided in accomplishing the work of acquiring these sounds by a judicious order in teaching, so that he may not be confused by attempting to learn, at the same time, elements too closely resembling each other in formation. The breath consonants may well be taught first, then voice consonants and vowels. We would suggest the following order as one which presents, possibly, as few difficulties as any. First, the breath consonants—h, wh, p, t, k, f, th, s, sh, ch. Then the vowels and vocal consonants alternately—a(r), v, aw, th, oo, z, -u-, m, -o-, qu, oo, n, ou, r, o-e, ng, u(r), b, d, g, j, ee, -a-, -i-, i-e, l; a-e; x, -e-, oi, u-e."*

While the breath consonants are being mastered, the teacher should devote much time to the cultivation of the voice. Vowel

*The non-vowels qu and x are placed in the second group because of their difficulty for beginners.

sounds are not attempted until the pupil can distinguish comparatively slight differences of pitch by the sense of touch. One of the smaller stringed instruments is usually employed for this work and the pupils find it a fascinating game to distinguish differences of tone as they stand blindfolded with eager finger-tips feeling the vibrating wood of the instrument. Differences of a very few tones are often noted by pupils after a little training. The child is now allowed to attempt his first vowel, but much labor is often required before it resembles any sound of human speech. Tense vocal cords may produce too high a pitch, but often the fault does not lie in the larynx, but in the resonance chamber above. Constricted pillars of the fauces, or a flabby, useless soft palate, may prevent the production of a pleasant tone. These conditions necessitate gymnastic exercises of the throat with a mirror, and there must be constant drill until the muscles are so controlled that we have proper resonance and a soft palate capable of controlling the direction of the passing stream of breath or voice.

The question at once arises, how is it possible for a deaf child to reproduce sounds whose positions, as in the case of the guttural and nasal consonants and nearly all the vowels, he cannot even see. It is in the solution of this difficulty that the Visible Speech Diagrams of Dr. A. Melville Bell have been of the greatest possible value. The teacher outlines upon the blackboard the profile of one of the class. Within this outline are drawn, in their natural positions, the teeth, the tongue, the palate, etc., making, when completed, a cross-section of the vocal organs. The pupils quickly grasp the idea of assuming the positions suggested by the drawing. Another most important use of the diagram is in portraying the faulty positions so frequently assumed by pupils. For instance, the trained ear of the teacher may tell her that a pupil is making *g* by bringing the back of his tongue into contact with the back of the pharynx instead of the soft palate. By drawing a diagram of this faulty position and contrasting it with the correct one, the pupil is enabled to correct his mistake at once. With older pupils these cumbersome diagrams may be discarded and Visible Speech Symbols used instead. These symbols are really abbreviated diagrams, and if rightly understood by the pupil, enable him to take the proper positions for the elementary sounds at sight.

But the ability to pronounce the elementary sounds is only the beginning of articulation drill. In speech the sounds do not follow but overlap each other, and each sound must be practiced in combination with every other—as the manner in which they overlap

varies with almost every combination. Smoothness of combination must be secured and the pupil trained to put stress upon the vowel as soon as he begins to pronounce syllables. When two syllables are joined, drill on accent must begin, and that be followed in turn by work on emphasis and phrasing when words are grouped in sentences.

The work in articulation here given in the barest outline may, as I have already said, be accomplished by the deaf child in the first few months of his school life. But years of intelligent, painstaking instruction are required if he is ever to master speech and gain the knowledge it alone can give.

The first necessity for every deaf child is an intelligent trained articulation and language teacher, preferably, of course, in his own home, but if circumstances make it impossible for him to receive expert instruction there, he should be placed in a school as near his home as possible, for it must always be remembered that he, more than his hearing brothers and sisters, need, the protection of home and family affection. His world is a world of fact—he is without the humanizing influence of the nursery rhyme, the fairy-tale or the Bible story—and with him out of sight is often literally out of mind. In schools located in large centers of population, pupils may easily be kept in close touch with family life and so free from the unfortunate tendencies of unbroken institutional routine.

Under expert instruction the better grade of pupils often become so proficient that they may be placed in schools with the hearing for the work of the High School grades, or indeed in schools for collegiate training. Attempts to carry on their instruction with hearing children at earlier stages have proved very unsatisfactory and can only be successful if the pupils have the assistance of an expert tutor. Such ideal conditions are obviously impossible for the mass of the deaf.

Theoretically, the day school for the deaf of large cities has many arguments in its favor, but where such schools are a part of the public school system the fact has not been recognized that to overcome the serious handicap of deafness the pupils require much more than the ordinary public school facilities for education. Physical and industrial training are absolute necessities and so far have been adequately provided only by the boarding schools.

In this brief presentation of the subject assigned me—the Development of Speech in the Deaf Child—I have pointed out the differences in physiological structure and psychological function between

the brain of the normal and the deaf child, and endeavored to show in what manner and to what extent, these differences may be overcome by proper instruction in speech. The occasion and the limits of this paper obviously forbid my attempting more than a passing mention of some of the more important points in a work which requires, for its successful prosecution, expert training and long experience.

In concluding permit me to add the thought that your society may do much professionally to aid us in this work. It is a matter of prime importance that the vocal apparatus of deaf children be maintained in a healthful condition and that whatever traces of hearing they may possess be conserved and strengthened. It is perhaps of even greater importance that medical men should be conversant with the best methods of oral instruction and their possibilities. The parents of children afflicted with deafness very wisely turn first to the members of your profession for advice and assistance. Upon your advice, in the great majority of cases, depends the deaf child's whole future. It, therefore, would be of incalculable advantage to the child, and an aid and an inspiration to his teachers, if the recognized professional ability, which has done so much for his physical relief, might be enlisted in the cause of his mental and moral development.

Mt. Airy.

The Surgical Treatment of Diphtheria. J. W. SHANKLAND, *St. Louis Med. Rev.*, April, 1910.

The surgical procedures mentioned are: 1. Injection of antitoxin. 2. Intubation. 3. Tracheotomy. Intubation should not be attempted where constant cough and expectoration would prevent its success.

Tracheotomy: The points to be considered in choosing between intubation and treacheotomy, are clearly detailed. Anesthetics, in these cases, are positively contra-indicated; local injection or freezing are to be employed.—EATON.

THE DEVELOPMENT OF LANGUAGE IN THE DEAF-CHILD.*

BY MR. J. W. JONES, COLUMBUS, OHIO.

To those who are familiar with the uneducated deaf child, it is well known that he is in no wise apparently different from his hearing brother. If nature's touch has not dwarfed or deformed his mental powers, he is alert, active, quick to comprehend, quick to act and responsive to all calls upon his attention. His body is vibrant with energy and yields readily to the activities of play and games. He answers the call of his parents to do chores about the house with the same interest and enthusiasm as the other children. He may go to the grocery or the butcher's and return with the articles for which he was sent, in less time, perhaps, than other children because he has not stopped on the way to talk. He is familiar with the fields, orchards and trees which are near and around his home. He is acquainted with the call of the physician and the visit to the dentist and oculist, and knows the official function of one from the other. He is as much at home in the nearby swimming stream as any of the other children. Every piece of household furniture he knows and its use. He knows the domestic from the wild animal; the one to pet and the other to flee from. He knows when the fire should be kindled in the stove and for what purpose, and when a special meal is being prepared and why. He feels the pleasure and thrill of new clothes, a clean body and a combed head. In fact, as far as ideas are concerned, he has, perhaps, as clear a conception of the uses of all of these things as the other members of the household. Yet he knows not a name of one. He is without any means of expressing his thought except in a very limited and in the crudest way. He lacks language. Being shut out from the world by the loss of hearing, the natural avenue of learning language, he must needs go through the hardest and longest processes of acquiring it.

In fact, the accepted philosophy up to the close of the sixteenth century and the beginning of the seventeenth, declared that the deaf child could not be instructed because he lacked language; "that thought and inform 'ion could only follow instruction in language and could, in no way precede it." Such philosophy was

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

ably upheld by some of the brightest men that our most enlightened countries of the middle ages and thereafter furnished. It prevented any attempt to educate the deaf. At this time, however, its correctness was vigorously denied. It was discovered that a great many bright deaf people had learned to express themselves in various ways, showing their minds as abounding in good ideas with an understanding of the nature and work of almost everything with which they came into contact, although they were unable to speak, read or write a single word.

Perhaps the greatest champion of this philosophy, since proven to be false, was the brilliant and distinguished John Conrad Amman, a Swiss physician. "In the human voice," he says, "may be said to dwell the very essence of life. The voice is a distinct emanation of that immortal spirit which God breathed into the nostrils of man when he created him a living soul." His chief follower, the well-known founder of the education of the deaf in Germany, Heinicke, declared, "it is the voice which shows forth the glory of God's gift to man. It is speech only which, fully comprehended, contains and expresses the movements of the soul. Every other means of communication is dead."

Charles Michael de l'Epée, a Frenchman and a resident of Paris, was the first to dispute this theory. He believed that the deaf could be educated to express themselves vigorously, beautifully and reverently, even though they might not be taught to use the voice for that purpose. In 1760 he established a School for the Deaf in that great city, and his instruction was based on a denial of the philosophy of Dr. Amman and his followers. He declared "there is no more natural and necessary connection between abstract ideas and articulate sounds which strike the ear than there is between the same ideas and the written characters which address the eye." The means of communication in his school was speech, the sign language, finger spelling and writing. Thus the very inception of a concerted effort to educate the deaf in the world was marked by a disagreement, and at no time since the founding of these two schools in different countries, has there been unanimity in the methods of educating the deaf, or in opinion as to what will bring to them the greatest blessings of life. But as to the correctness of the philosophy promulgated by Dr. Amman and his followers, the school of De l'Epee has demonstrated its absurdity. This school attracted world-wide attention. It had visitors from foreign countries, among whom were crowned heads and prominent and intelli-

gent people of all classes. The fact that the school he founded has since become a national institution, using speech exclusively, in no way reflects upon his educational philosophy. Other considerations have brought about this result. But no one who is at all familiar with the accomplishments of the deaf, will deny that they may become well skilled in the use of written language, being taught wholly and independently of speech. The thousands of deaf people in other countries, particularly in America, who have learned to express themselves first in the manual and sign language, and secondly on the written page, have substantially proven that the Abbe de l'Epée was correct.

But whether we accept the philosophy of Dr. Amman and Mr. Heinicke, or of the Abbe de l'Epée, the development of language in the deaf child is a most difficult task. It has occupied the best thought in all these years of those engaged in their instruction. It is the chief goal in their education. Instruction in every other subject depends upon their ability to use language intelligently and correctly. It requires times, patience, intelligence and a correct understanding of the use of the best devices which have been invented to teach the deaf child how to write language correctly in any reasonable length of time.

Any language is distinctly foreign to them. They must learn it as hearing people learn a foreign language, except that they have the additional handicap of being without any language in which to receive instruction, or with which to compare the new language they are learning. However well the uneducated deaf child may know one object from another or its uses, he knows not its name. No lexicon is of any help to him at the beginning. Nor can we compare him with the hearing person in a strange land learning a foreign language. For there the hearing person is in touch with the new language at every turn, while the deaf child's instruction must be confined to his few hours a day in the classroom. The rest of the time he is left alone in his silence. He is cut off from the daily and hourly communication with those who know the language he is learning. It is, therefore, not a surprise that it takes a number of years for an intelligent deaf person to learn to use language well and that it takes in addition to ten or twelve years in his home school, a college course to give him a fair mastery of his language. The written language of the partially educated deaf is much like the language of a foreigner who has been in our country a few years trying to learn English.

But to return to the beginning of the education of the deaf in France, we wish to note the plan adopted at that time and the changes which have taken place since. We return to France rather than to Germany or England, because it was from the French America received her instruction in this particular line of education and the French methods were adopted in the first school established in the United States at Hartford, Conn., in 1817. From that school sprang all the earlier school established in the various States, which schools copied the methods used in Hartford.

The sign language as founded by de l'Epée was quite different from that in use at the present time. It was a language of work signs. The present sign language is one of signs for ideas, and is more natural and pleasing to the deaf than its predecessor. It would naturally be expected that there would be improvement. But whatever improvement has been made, the glory and honor which the educated the world over originally bestowed upon de l'Epée for the great blessings he brought to them, has not diminished in the least, but rather grown as the years succeed each other.

He was succeeded by the Abbe Sicard, who enlarged the scope and perfected the system of his predecessor. Under it the bright deaf child could translate a story rendered in the sign language into English almost word for word, although he might not know the meaning of much of the language he had translated. This correct translation, wonderful as it appeared, was really not satisfying to the skilled teachers of the deaf because they found that their pupils when thrown upon their own resources and required to express their ideas in written language, fell far short of the correct expression.

Sicard was succeeded in 1822 by Bebian, who conceived that the converse of the methodical sign language established by de l'Epée would be the better method of securing the correct and original expression in written language. He therefore discontinued the methodical sign language which, as has been said, consisted of a sign for each word and adopted the pantomime, which means a natural language for ideas. He felt if the pupils had correct ideas and were forced to express them in their own language, a more perfect written language could be attained. This was a new idea and theoretically had much to commend it.

It is an old and well-known proposition in teaching that pupils learn best by doing. Why should it not apply to deaf children?

They received and imparted their ideas in natural pantomime. Why should they not become masters of their language by being compelled from day to day to express these ideas in written language under the direction of their teachers? It looked plausible and reasonable; and so this new idea soon spread over many of the countries where the deaf were being educated. Besides it was the easiest and most beautiful language, and this helped to its ready acceptance. A few years of experience in testing it, however, demonstrated that it was ineffective, except in the hands of the most skilled teachers. The same errors constantly appeared in the written language of the deaf that existed before.

Another philosophy appeared in 1836. It was announced by the Principal of the National Institution at Bordeau, Mr. J. J. Valade-Gabel. He had been a pupil of the famous Pestalozzi and was therefore afire with enthusiasm and earnestness. He conceived the ideas that the sign language, of whatever kind, was the confusing element in the teaching of written language; that the well-accepted educational proposition stated above, "learning by doing," would find its best application in teaching the pupils from first to last to use written language without the intervention of help, in any way, of signs. He therefore, depended entirely upon the spelled and written language.

He was an indefatigable reformer and brought the Bordeau Institution a great deal of intelligence and successful experience. His ideas, therefore, were seized upon by many people who had been discouraged in teaching the deaf written language. The sign language of ideas, however, was so easily understood and so beautiful that its supporters refused to exchange it for this new intuitional language, and but little progress was made in supplanting it, except in the one particular school at Bordeau. I know of but one school in this country whose management has accepted the Valade-Gabel idea. This is the School for the Deaf at Rochester, N. Y., under the able management of Mr. Z. T. Westerfelt. His system of instruction is based upon the practice of the manual spelling in all communications between the pupils, and pupils and teachers. It is practiced on the play-ground, in the dining-room and everywhere there is occasion for conversation. In this school the sign language is entirely abolished and the English language in spelling and written form is everywhere used. It is claimed by the friends of this school that its pupils have a better command of the English language than most other schools for the deaf. This, however, is disputed by the friends of other schools.

It is now necessary to consider the effectiveness of the educational philosophy of Heinicke of Germany. His philosophy will be remembered as having speech and lip-reading as its basic principle, a prerequisite, as he claimed, to the development of ideas and the teaching of language. His method of instruction spreading to England and other Anglo-Saxon nations, has taken greater and greater hold upon all Schools for the Deaf throughout the civilized world, including the school founded by Abbe de l'Epée in Paris. The growth of the idea and the wide-spread use of speech and lip-reading throughout the world is not so much due to its effectiveness in the teaching of language, as it has been brought about by the desire of the parents of deaf children that they should talk and be able to understand what others say by reading the lips and by their abhorrence of the "hand language," as they term it.

Being a system of education, however, which must necessarily make constant use of language in its natural order, its friends claim, as did Valade-Gabel, that it is the very best method of teaching language, and that the pupils so taught express their ideas in natural order and with much more certainty and ease than pupils who are taught the manual and sign method. This part of the theory is now generally accepted by all educators of the deaf, even in schools where the sign language and finger spelling are the accepted method of communication. In such schools the signs are restricted in the school room and the pupils are thrown upon the use of English expressed by finger-spelling and by writing.

This unanimity of opinion, as far as teaching language is concerned, did not express, however, the satisfaction with results accomplished. The correct use of language by the deaf has always been, and is to-day, whatever methods have been used in teaching, proportional to the intelligence of the pupils, to the length of time they have been in school and the ability and enthusiasm of the teachers who have given the instruction.

This leaves us to consider the various devices and plans which have been invented and developed for the purpose of teaching language better, all of which have grown out of the unsatisfactory results attained.

The best way of describing the language of the partially educated deaf is to say, it is mixed. The order of words has always been a bugbear to them. The various verb-forms have given them much labor and worry. They are liable to use one part of speech for another, using nouns, adjectives, adverbs, etc., as verbs. The idea

may be right in the child's mind and it will be understood when put on paper, but his manner of expression often causes merriment to those who read. A most striking illustration of that came to my notice a short time ago. One little boy was seen to strike another in the class. His teacher reproved him. His defense was, "I whyed him and he wouldn't because me." No one would misunderstand what had taken place between the two boys, but he took the shortest and to him, the most effective method of stating it. His ideas had outrun his language. A teacher had taken her class to see the Seventeenth Regiment leave for the Philippine Islands. She desired to use the occasion for journal writing, and as a language drill. On the return the pupils were to write what they had seen. One boy wrote, "many men were banding, but I did not see them horn." Evidently he was impressed with the great number of men in the band, but that they were not playing when they passed him. A girl in describing sheep-shearing said, "The farmer washed and nicely the sheep." A little fellow handed to me, one day, a letter which he had written to his father, and his first sentence was, "I am dead. The boys kill me."

To overcome all these difficulties the earnest teachers of the deaf have devised many plans. One of the earliest was the separation of sentences into their component part having symbols for the various parts of speech and drilling the pupils to a perfect understanding of them. With the symbols before them, they were enabled to follow in the natural order, but without the symbols they fell into the same manner of errors as before. This was known as the technical grammar method. Pupils were required to diagram sentences and parse words to the minutest detail of etymology and construction.

The technical grammar method being stripped of much of its detail, and the technical names being used as nails on which to hang the descriptive terms, in explanation, is a valuable aid in teaching language. It is used in simpler forms in many of the best schools throughout our country.

Opposed to this method in the earlier day was the sentence method. This gave expression to the idea as a whole. It is also in use in many of our schools at the present time.

Teaching of the deaf is necessarily objective until a knowledge of language is formed. Hence all school-rooms for the deaf are well equipped with objects and pictures. A skillful teacher of the deaf is ready with the crayon for drawing. From these objects and

pictures a large vocabulary of nouns and adjectives is secured. By means of actions a knowledge of verbs and their names are learned. Putting these together, we have a simple sentence which the children soon understand. After acquiring a certain amount of language, the processes of education are about the same as are apadapted to hearing children in public schools.

But no device has yet appeared which makes the work of teaching language easy or which will take the place of the intelligent, enthusiastic and industrious teacher. In her hands, whatever plan is used, the best results will be attained. She will equip her school with objects, pictures and appliances and use them all as the condition and the necessity demands. As physicians are born, so are teachers. As there are lifeless, clumsy, disinterested, ineffective physicians, so there are weak, ineffective teachers. As instruments are but helps in your hands, so are devices, books and pictures but helps to the intelligent teacher. As must be in your heart, the elements of success and personality, so must the fountain from which will flow the greatest accomplishment in teaching language to the deaf, be found in the teacher herself. Under any and all circumstances, the road is difficult and beset with many discouragements. To her who is most liberally endowed by nature, is in the best state of mind and health, with the deepest insight into human nature and the greatest enthusiasm and perseverance, the journey is the safest.

Diphtheria from the Neurological Standpoint. H. UNTERBERG, *St. Louis Med. Rev.*, April, 1910.

According to Sir Wm. Gower: "It is probable that one-fourth of those who die from the primal disease, subsequently suffer from paralysis." The various estimates, according to Unterberg, of good authorities range from 8 per cent to 66 per cent. Many occurrences of palsy seem to follow apparently trivial affections, and many cases, diagnosed as simple sore throat, which are followed by paralysis, are really diphtheric."—EATON.

THE DEVELOPMENT OF SPEECH-READING IN THE DEAF CHILD.*

BY MISS MARY MC COWEN, CHICAGO.

So much has been said and so ably by previous speakers that it might almost seem that nothing further remained to be said about the deaf. But, however well he may be developed mentally, educated in the knowledge and uses of language and speech, and trained to understand all that his partial hearing appropriates from the world of sound, without speech-reading, the deaf child is still on the off-side of a chasm with no bridge near to span the distance between him and the world of hearing people. True, a message may be flashed across by the use of conventional signs, but like the wireless, this can only evoke reply from properly equipped stations, the one among a thousand or more who is familiar with the language of signs. Or a message may be sent by finger spelling, but this too will only be recognized and answered by the few who have been trained to know language through finger spelling, and it, in common with writing, has the additional disability of being "the longest way round"—naming every individual letter in every word used, as they do, and both writing and finger-spelling are therefore accounted slow and tedious by the general public. Speech, because the universal medium of communication, even poor speech, if barely intelligible, appeals to and is understood by the world of hearing people and through speech-reading may bring direct and swift reply.

What then is speech-reading, this medium that puts the deaf child who never heard, and keeps the partially deaf child or adult who is gradually losing hearing, in close touch with friends and associates of the hearing world. The ability to understand spoken language by watching speech movements on the face of the speaker. Truly this sounds very simple, but it, too, must have its limitations. Reading, we know, is interpreting the thought of others expressed in language-symbols, written or printed. Speech-reading is therefore interpreting the thought of others expressed in speech. Speech is the universal oral symbol of language, and speech-reading must therefore impose a knowledge of both speech and language upon

*Read before the Sixteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., April 29, 1910.

the part of the speech-reader. Thus is established one definite limitation upon the realm of speech-reading, which is large or small, broad or narrow, according to the knowledge and understanding by the speech-reader of speech and language.

Language, the inclusive term, is here construed to mean the accepted medium for expression of thought and interchange of ideas among human kind, and assumes various forms, some of which appeal to the eye and others to the ear, some being expressed by the hand and others by the mouth and allied organs of voice-expression. Signs, gesture, finger-spelling, writing and print are expressed by the hand and appeal to the eye. Emotional language and speech are expressed by the voice and appeal to the ear, emotional language including the cry, laugh, sigh, shout and song, speech being the one oral symbol of language expressed in definite words.

To illustrate the inter-dependence of speech, language and speech-reading, we note the following conditions. 1. A deaf child can be taught to articulate the elements of speech clearly and to pronounce words, but unless such articulation stands for the expression of thought it would remain simply articulation, could not rightly be called speech, is not in any sense language and could therefore be no basis for giving such a child speech-reading. 2. An educated deaf person, who had no knowledge of speech could be taught speech-reading, but in such a case the speech symbols would be interpreted, not through spoken or heard language symbols, because unknown to such a one, but through the famaliar written language symbols, and speech-reading having so little opportunity for use, would be of correspondingly limited practical value. 3. A deaf child, knowing nothing of either speech or language, would have no basis for the interpretation of speech-movements, and therefore the movements on the face of a speaker would necessarily be meaningless to him. 4. A deaf child, who has made a bare beginning in language-getting and knows say ten words, if taught orally, will understand by speech-reading those ten words. 5. A deaf child with what might be called a Second Reader vocabulary, will be able to understand to the limit of that vocabulary, while a man of culture, speaking fluently several different languages, if deaf, or becoming deaf, can be taught to understand through speech-reading any one or all of those languages.

In analyzing the possibilities of acquiring speech-reading we find a still greater difference between the deaf child just beginning to

get an education through speech-reading and the educated adult who is becoming deaf and wants to learn speech-reading. The latter has command of a conventional language, his mother tongue, and through the printed page he can still keep in touch with all that is being done in the world. Speech-reading is to him merely another form of language to master, a translation, as it were, of known language-forms, spoken, heard, written, into the language of mouth movements or more properly, facial movements, and can be acquired by any intelligent adult who wishes to give the matter sufficient time and effort. The illogical spelling and idiomatic structure of English add to the difficulty, but these, while somewhat different, are no harder than the difficulties met and mastered by every little hearing child in learning to read. For the little deaf child there can be no process of translation, for he has no language to translate, has yet to learn his mother tongue. When taught orally, speech-reading becomes to him the unconscious medium through which he learns his first vocabulary, and which he should continue to use as unconsciously as the hearing child uses hearing in getting his education.

As to the process, Mother Nature's way of learning a language through use, is a good rule to follow in learning speech-reading. Life, even the simplest, is but a succession of situations that demand the use of speech-expression, and these, if utilized, furnish ample opportunity for the little deaf child to acquire the understanding and recognition of language, which is speech-reading, unconsciously before he is of school age. Too often, however, this golden opportunity is wasted because the child's companion, be it mother, sister, servant or friend, either does not know how to give the little deaf child the necessary attention or is too much occupied with other cares to give the time, and both of these, attention or wise companioning, and plenty of it, which means time, are in this case indispensable elements. It is always easier when a deaf child is wanted, to beckon with the finger than to take time to teach him to understand and recognize the spoken word "come," but when once learned, the spoken word is no longer more difficult than the other and the more frequently the word is used and understood the stronger does the habit become of watching the face instead of the hand for speech. It is much easier in the beginning, to think for a deaf child, to supply his every need without giving him a chance to try to ask for what he wants, but this habit of mistaken kindness which anticipates every want, robs him of his inherent right to learn language in the easy natural way—through use

—and sends him later to school, not only without language, but without that mental quickening and discipline that comes from early natural language-getting and leaves him permanently at a disadvantage among his fellow-men.

The hearing child is unconsciously absorbing language through all his waking hours, and it matters not what language, nor how impossible it may seem to an adult. Indeed, no language is too difficult, even the most intricate, for the hearing babe to learn to understand, and later to use, if only he be surrounded by it, if it happen to be the vernacular of his environment at the natural age for language-getting. Parents who wish hearing children to acquire fluency in a foreign tongue provide them while young with a companion using only the desired language. Could we but give every congenital deaf child a chance to learn language through use, and by means of speech-reading, at the natural time, before the Kindergarten age, we should have fewer so-called stupid deaf children in our schools, and much less of the uncomfortable "deaf-mute" voice which can be modified by careful early training. The initial expense would no doubt be greater, but the results as compared with present conditions would more than compensate.

Another large class of children to whom speech-reading may be of untold value are those hard of hearing, whether congenital or adventitious. Some of these children are permanently in schools for the deaf; many hundreds more are scattered throughout our public schools, and, misunderstood and harshly misjudged as they often are, should command our interest quite as much as the congenitally totally deaf child. All who are too deaf to hear the question and response of the ordinary recitation in the regular school room, unless given speech-reading, will ultimately fall behind their classes, the school work becoming more and more difficult and impossible as they advance in the grades, and as more is expected and demanded of them, till they finally reach a point of utter discouragement, where the effort to participate in the activities of the school-room continually leads to uncomfortable mistakes and misunderstandings, their unhappy isolation being far greater than that of the deaf born, for they know and realize the enormity of their deprivation, and rebel bitterly against it. All this class of children, to begin with, have approximately perfect speech, but without speech-reading, as they naturally use speech less and less, it will steadily deteriorate. If all such children would be recommended to a teacher of the deaf, to get speech-reading, as soon as their growing deafness were discovered, a majority of them could

return after a time to their classes and, using speech-reading, complete their education with hearing companions.

Of the three classes named, for whom speech-reading is possible, and a distinct advantage, the little deaf child is the only one for whom it may be said to be easy, and that only when acquired unconsciously while getting the use of his mother-tongue. The degree of so-called difficulty for the child with perfect speech and some education who becomes deaf and the adult who is deaf or becoming deaf, depends largely upon the individual attitude towards study or sustained mental effort and earnestness of purpose. A foreigner who comes to this country without funds and is obliged to make himself understood or starve, will acquire English in a surprisingly short time. The records of success in the world along every path are the records of those who earnestly wanted something and were willing to work for it till secured. The man who, losing his right arm, would still find a way to do a man's work in the world; if deaf, would get speech-reading.

In this brief presentation we have discussed none of the technical difficulties of speech-reading, have barely mentioned the economic question, and expense is often a controlling factor, have urged it, not as an end in itself, but as a means—entirely possible, the most practical—toward bridging the gap between the deaf child and the hearing world; a step that if persevered in, will bring one of the so-called defective classes, and that the most hopeful, a little nearer the normal type of man. The one-armed man though in spirit he surmount his affliction and does a man's work, must remain physically a one-armed man, the deaf child, deaf, but with the alert mind, the eye trained to catch thought from the subtle movements of the speaker's face, will be able to give and get more, in the home, at school, among friends, in business and in social life; to live a more helpful and happy, a richer and a fuller life.

414 North Normal Parkway.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, January 10, 1910.

JOSEPH H. ABRAHAM, CHAIRMAN.

Case of Frontal Sinus. Presented by LEWIS A. COFFIN, M. D.

This case was presented in order to express the feeling of the patient as to the intranasal and extranasal methods of operating, in the presence of the patient. The patient showed an excellent result, but Dr. Coffin stated that he would report the case later. It was enough, at this time, to state that the lady, who in 1908 was almost a nervous wreck from headache and inability to use her eyes for any considerable time, is now entirely well—in fact, feels so much better on the operated side than on the other that she is sure the other one is diseased; and although at first on account of promised scar and deformity she was quite adverse to any external operation is now very willing on the doctor's advice to have a radical Killian done on the right side, but will not consent at all to what she calls "those horrid intra-nasal operations." There is no discharge, and vision has increased for distance one line of Schnellen's test type.

Neoplasm of the Larynx. Presented by DR. WOLFF FREUDENTHAL.

This patient, a woman, was presented on account of the difficulty encountered in reaching a diagnosis; in other words, of differentiating between a specific lesion of the larynx and a certain kind of neoplasm. The patient is 62 years of age and appeared for treatment 14 months previously. She said then that she had been suffering for 3 weeks with her larynx. The trouble commenced overnight. She awoke one morning feeling husky, and the condition grew worse until she was almost aphonic when she came for treatment. On examination it was seen that there were ulcerations in the larynx on the left side, and some pain in the left ear. The left cord showed a whitish mass, almost snow-white in certain parts, and this mass extended below the glottis. The movements were slow and were much less extensive that those of the right side. At the anterior angle there was a reddish-looking growth like a

polypus, and it seemed to encroach upon the right side slightly, but this was not certain. The movements of the right side were perfect, and there were no glandular swellings. The picture was such that a clinical diagnosis of neoplasm was made. Later, on two different occasions, pieces of the growth were examined microscopically, and both pathologists independently confirmed the correctness of the first diagnosis. Total laryngectomy was consequently recommended, though a few weeks were consumed in reaching this conclusion, and the mass had grown larger in the meanwhile. The polypus at the anterior angle had spread far to the left side, until the mass occupied the whole anterior portion of the glottis. It also spread farther back and there was a little swelling and edema on the posterior part, and some infiltration on the right side.

The family, however, were not prepared to consent to operation, and at the suggestion of Dr. Boldt, who had removed a fibroma of the uterus from the patient a year before, another piece of the growth was removed and sent to Dr. Welch for examination, who reported that he was not yet prepared to reach a definite conclusion, but thought that the case might be specific. Dr. Boldt knows the family very well, and thought that this was probable; so K. I. was given 5 drops t. i. d. and going up to 100 drops t. i. d. This was continued for 4 or 5 months, and soon after she began this treatment the condition improved. The right side cleared up quickly, and the left side commenced to shrink, and a few months later it had the appearance which it now presents. Astringents were seldom applied. She was given high frequency treatment, which relieved the pain very much. She has now no pain, her voice is pretty good, and she talks very well, although sometimes when she talks too much she notices the effects the next day.

DISCUSSION.

Dr. Coffin said that he had lately seen a case of apparently the same character in a woman of about the same age. He was called up one night and asked to intubate a patient whose doctor felt that she could not get through the night without it. When he saw her, the physician stated that she was breathing a little better than she had been doing. He applied cocaine and adrenalin and obtained still greater improvement, and advised that she be sent to the hospital in the morning, when he would do a tracheotomy instead of an intubation. His feeling at the time was that it was probably a specific growth. When she was admitted to the hospital, Dr. Jonathan Wright examined the condition and agreed that a trache-

otomy should be performed and the patient put upon specific treatment. Tracheotomy was accordingly done and she was put upon injections of mercury, using the salycilate in albolene. Iodalbin was also given in 5 grain doses. The growth has entirely disappeared, though she is still wearing the tube. She was told yesterday that it could be removed by her physician at any time.

Dr. Coffin said that he thought in these cases which give no history of having been treated for syphilis a thorough course of mercury should be instituted as at least a part of the treatment—that the iodides could not be absolutely depended upon.

Dr. Lederman told of a case which corroborated Dr. Coffin's experience. He had been called upon by a physician to confirm his diagnosis of epithelioma of the larynx. The patient was a well-nourished man of 45, who complained of no pain but had difficulty in speech, and was quite aphonic. On examining the throat the condition did not seem malignant, and he asked the physician if he had obtained any specific history, and received the reply that the patient had denied having had specific infection of any kind. The patient was again interrogated, and said that he could not remember, but before attempting to take out a piece for examination Dr. Lederman determined to try the specific treatment and started the patient on 15 grains of iodide, running it up rapidly. In 4 weeks the mass had entirely disappeared. This is another illustration that before attempting to remove a portion of the growth for microscopical examination the patient should have the benefit of anti-specific treatment.

Dr. Packard said that he thought the Wassermann reaction possessed much value in these doubtful cases before specific treatment was begun. He does not think the treatment is of much value if the patient has been under specific treatment. In another instance no one could have declared positively that there was a specific growth. The patient was put in the ward with the idea of doing a tracheotomy, but it was decided to use the Wassermann test and wait for the result. The patient was put where she could be watched, and after a positive report was given, inunctions and hypodermic injections of mercury and some iodide were made. At the end of 2 or 3 days she began to get better, and is now doing quite well.

Dr. Simpson said that there was one characteristic in these specific growths, illustrated in Dr. Coffin's case, and the one mentioned by Dr. Packard. In severe specific lesions of the larynx which have existed for some time possibly without having been noticed,

and then sudden interference with breathing takes place, they are nearly always specific. They are very prone to sudden exacerbations, which is not a characteristic of malignant lesions. This is a very good point.

DR. EMIL MAYER said that it was always his custom to suspect syphilis and treat the patient for it in every case, and he cited a case in point: A man aged 55 appeared at the speaker's clinic 8 months ago with a laryngeal tumor which was to all appearances malignant. The patient was told that a piece of the growth would be removed for pathological examination, if he would enter the hospital, with the understanding if it proved malignant operation should immediately follow. This he declined and then went the rounds of every institution in the city. A week ago he reappeared and begged to be taken in the hospital, his dyspnea having increased and his voice reduced to a whisper. He was admitted and a small piece of the growth removed, and the pathologist reported that there was no evidence of malignancy in it, and all the appearances of lues. A second removal gave the same report, the Wassermann test being negative. (Subsequent antisyphilitic treatment showed the statement of the pathologist to be correct).

In this connection the speaker wished to emphasize the point made by Dr. Packard, that the Wassermann test could not be valuable if the patient was under antisyphilitic treatment at the time. The Wassermann test is of undoubted value, but not so great as many suppose, and erroneous impressions as to its enabling us always to depend upon it as regards the presence or absence of syphilis have gone forth. The speaker mentioned another case where the Wassermann test was negative, and the clinical diagnosis of syphilis was made and substantiated by the resulting cure of the patient by antispecific treatment. The Wassermann test should nevertheless be made.

DR. ABRAHAM said that six months ago he had seen a case in consultation with a prominent medical man of this city who did not agree that the case was syphilitic; the neoplasm involved chiefly the pharynx, but the larynx was also affected. Dr. Abraham advised him therefore to continue the treatment of the case, for he felt convinced that it was syphilis. A Wassermann test was made, which was negative, and 2 weeks later a second one was made, also negative. The patient consented to be placed on a specific treatment. Three weeks later after administering the first dose of iodide every vestige of the growth had disappeared.

DR. FREUDENTHAL said that there was no question but that in every case of carcinoma the patient should first have the benefit of anti-specific treatment, but the point he had wished to bring out in the case presented was that the clinical picture was so much like carcinoma and so typical for it that every one would have made the same diagnosis. Two members of the Section had seen the case before he did, and they made the same diagnosis, yet in spite of this the patient improved under antispecific treatment. The swelling had not appeared suddenly, but developed in four to six weeks. All who saw her this evening seemed to have settled on the final diagnosis of lues, and that must now be accepted, though still he did not feel absolutely convinced that there was not an underlying epithelium here. He could not understand why the vocal cord should remain as it has been for the last 6 months. Of course, the gentlemen who saw the patient to-night could not examine her thoroughly, but he has studied the case very carefully and still has the idea that there might be an underlying carcinoma in spite of all the evidence to the contrary.

Personal Experience with Tonsillar Hemorrhage. By JAMES E. NEWCOMB, M. D.

Personal Experience in Tonsil and Adenoid Work During the Past Twelve Months. By F. R. PACKARD, M. D.

DISCUSSION.

DR. SIMPSON said that the subject was so large and would undoubtedly receive much discussion, so he would confine his remarks to a few points, on the question of hemorrhage raised by Dr. Newcomb. Although all present had done may operations in tonsil and adenoid cases, fortunately most had met with few or no fatalities, still it was the one or the few fatalities that made the deepest impression, and it is the one fatal hemorrhage which we wish to obviate. It is impossible in the average case as we operate in the hospitals to tell whether or not a given case will turn out favorably, as far as hemorrhage is concerned, but from the numbers that do occur some reported and some unreported, it is our duty to surround ourselves with all the precautions possible, so that if any fatality should occur we can feel that we are not to blame.

It is our duty first to inquire into the history of the patient and find out whether or not there is any hemophiliac tendency in the patient or family. He had been much interested in the question of giving lactate of calcium. If there is any question of a hemophiliac tendency the coagulation time should be taken. Despite some

counter opinions in regard to that matter, he believes that there is a normal period for coagulation, and it is also a wise precaution to give the lactate of calcium for three or four days before and after operation. It is not so much the influence that the lactate of calcium has upon the cut vessels at the time of operation as its very important effects in preventing secondary hemorrhage, possibly, such as occurred in the case reported by Dr. Packard. In the large number of cases that he has recorded, it is a peculiar coincidence that the only ones in which there was severe hemorrhage were those in which the lactate of calcium has not been administered. During the period in which his observations were made, he had had five cases of severe hemorrhages to sustain this coincidence. One case, which had been reported in the *Medical Record* of September 25, was very instructive. The patient was a boy from San Domingo. When the tonsils were removed the hemorrhage became quite severe; after that had been controlled, the adenoids were removed, when a very profuse hemorrhage took place and continued until the boy became almost exsanguinated. The history that was afterwards elicited from the family was that about a year previously a sister of the boy had been operated upon for the removal of her tonsils and had nearly bled to death. This boy was given lactate of calcium as soon as his vomiting ceased and the effect upon the coagulation was soon noted. As the blood came to the surface of the tonsils it would coagulate immediately in large masses. The boy subsequently recovered, but it was a very severe case. The doctor said that he had no doubt that if the calcium lactate had been given before the operation the continued hemorrhage would not have taken place.

Then, the question of operating for adenoids and tonsils in a case where the time of coagulation is above normal or where there is a history of a hemophiliac tendency, should be very carefully considered.

The conclusions gained from his clinical experience show[1] that the time of blood coagulation is shortened by the administration of calcium lactate; 2, that before operating, especially in tonsils and adenoids, careful inquiry should be made to determine if there is any hemophiliac tendency, and in suspicious cases the tendency should be investigated before operating—indeed, it is questionable whether in such cases the operation should be undertaken; 3, that in all cases calcium lactate should be administered prior to as well as after operation; 4, that of the calcium salts the lactate is the most positive in its results, the most agreeable to administer, and

the most agreeable to the stomach. He would like to hear from some of the members whether they considered tonsillectomy resulted in a greater tendency to hemorrhage than the operation of tonsillotomy.

DR. BODINE: There are two types of tonsillar hemorrhage requiring surgical assistance to control, one the fast and furious type, the other a slow but persistent hemorrhage, both differing only in the time required to accomplish the same result to the patient. In the fast and furious bleeding he was inclined to believe that in nearly every instance it is venous. He could not see how one of the anatomically named arteries of the neck could be injured by a properly performed tonsillectomy. Only in those rare instances of anomalous distribution of the arterial cervical tree could a large vessel of the arterial system be injured, certainly not the internal carotid. Either the furious hemorrhage mentioned or the slow, persistent one, is most frequently the result of the partial severing of a vessel. A piece of the vein is clipped out, not divided completely across, or in pulling on the tonsil a branch vein is torn off the parent trunk, leaving in the lateral wall of the parent vessel a triangular opening. The vein, under these conditions, cannot contract or retract, and the bleeding is thus persistent. One of the most difficult things, he imagined, was to determine in the face of the tonsillar hemorrhage what signs on the part of the patient justified one in determining to enter the patient's neck and tie the carotid. Possibly syncope in the famous type of hemorrhage was a positive indication. Once the emergency of entering a neck to control the hemorrhage is forced upon us, then speed in its accomplishment is the most essential factor of the technic. Most persons think of and attempt immediately ligature of the external carotid, but you can throw a temporary loop around the common carotid vessel in half the time. Its situation is anatomically such that it can be found quickly and temporarily occluded until the ligature is placed around the common carotid. If a No. 1 piece of cat-gut is thrown around the external artery and tied sufficiently tight to obstruct the blood stream, it will not cause permanent occlusion of the vessel. As the artery is ligated in continuity, only force sufficient to obstruct the stream and not break the intima should be employed. If the patient is 10 or 12 years of age, a general anesthetic for this operation is not at all necessary. He has ligated the external carotid artery a number of times without pain to the patient with local anesthesia.

In the slow, persistent type of hemorrhage after tonsillectomy, one that persists during a number of hours or days, there is a dis-

position to look upon it as a condition of hemophilia. Dr. Bodine said that this condition of hemophilia had been one of great interest to him on account of its exceeding rarity in his experience of twenty years of surgical work. He has yet to see his first hemophiliac, though he is convinced that such a condition does exist; yet he looked upon it as a white-blackbird of surgery in its rarity. He knew of one woman who bled slowly and persistently for a number of days after repair of a lacerated cervix. She was rapidly approaching the danger point of exsanguination. Her condition was looked upon by the attending surgeon and consulting colleagues as one of true hemophilia. In fact, a substantiating history of persistent bleeding after injury in both the patient and her mother had been obtained. It was found upon reopening the wound in the cervix that a vessel, possibly the circular artery, had been partially divided, so that the ends could not retract or contract. Complete division of this vessel with scissors stopped the hemorrhage without the necessity of a ligature. Another cause of persistent hemorrhage after tonsillectomy and one Dr. Bodine believed far more frequently a causal factor, was the automatic and unconscious sucking of the clot from the end of the severed vessel at each expectoration. He believed that this was also the cause of those oft-reported cases, especially in newspapers, of bleeding to death after extraction of teeth. In the act of expectorating the bloody saliva, an oro-pharyngeal vacuum was caused by the closure of the post-nasal orifice with the soft palate; and in this way the clot was sucked from the mouth of the vessel, and bleeding started anew at each act of expectoration. In several cases which had come under his experience of persistent hemorrhage, he had been able to check them by preventing expectoration; and he had come to believe that in the majority of these cases, despite the fact that hemophilia is a frequent explanation, simply placing a cork between the teeth of the patient would check the bleeding. Dr. Bodine said if he were engaged in the special practice of naso-pharyngeal surgery, he would make it a rule in every case of tonsillectomy and adenoid removal to insert a cork between the teeth after operation until hemorrhage was securely checked, and furthermore, he would instruct the parents in charge of the child to put this cork in if the patient began to bleed anew.

Dr. Hurd said that Prof. Leffert's classification of nearly thirty years ago still holds. Fatalities rarely occur, but one should always be ready for the serious cases. They will come to all some day, and laryngologists should qualify and equip themselves to tie the ex-

ternal carotid when necessary. He had never heard of an instance of cutting the internal carotid in operating, but it was perfectly plausible that it should happen. The vein runs up the post-pharyngeal walls, where it is often seen pulsating. That is well illustrated in Sir Felix Semon's latest edition.

Dr. Hurd said that he himself had had two cases resulting fatally from status lymphaticus. One of these patients two years ago died 3 hours after ether, and it was ascribed to status lymphaticus. There was no autopsy. This Fall he had a colored child who went through the operation all right, but 20 minutes afterward it suddenly died. The autopsy report was that the cause was status lymphaticus. There was nothing to suggest this beforehand, no difference in the tonsils, or anything else to show clinically such a condition.

In tonsil operations he likes to give a general anesthetic. He had this Fall removed the tonsils from a man under local anesthesia, who had a furious hemorrhage, and he pleaded not to be touched, for he did not wish to have anything more done to him. Dr. Hurd told him that something must be done to stop the hemorrhage, and had him stand up; he fainted and that stopped the hemorrhage. Two months ago he had seen a tonsil which had been sliced off flush with the pillars with a tonsillotome.

This occurred at 5:30 p. m. The patient was admitted to the hospital at 6 p. m. He was called up and was told that the child was almost exsanguinated. He instructed them to put clamps on, and when he saw the child the pulse had gone up to 150. There had been no syncope. He immediately gave the patient an intravenous injestion of saline, sent the child to the operating room, and tied off the carotid, and sent for some of the members of the family to give blood for a transfusion. The hemorrhage still persisted, and just after the mother got to the hospital the boy died.

As a rule, the surgeon rarely sees the tonsillar cases afterward, as the house surgeon usually checks any bleeding by simple measures, and the instance which he had related was the only one with serious results, or where he had had to tie the carotid; but they will occur now and then.

Replying to the query in regard to the frequency of bleeding after a tonsillectomy or a tonsillotomy, he was inclined to believe they were slightly more frequent after tonsillectomy than from tonsillotomy.

(*To be Continued*).